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Published for the Owners,

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.,

by

WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.

Entered as second-class matter, November 9, 1913, at the post office at Baltimore, Maryland, under the Act of March 3, 1879

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BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief

FREDERICK V. RAND, Associate Editor-in-Chief

National Research Council, Washington, D. C.

Vol. 13

SEPTEMBER, 1924

No. 9

ENTRIES 6339-6849

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 6459, 6696, 6701, 6765, 6769, 6777, 6778, 6824, 6829, 6835)

6339. ANONYMOUS. Bureau of Sugar Experiment Stations. Summary of twenty-one years' work of the bureau. *Australian Sugar Jour.* 14: 75-79. 1922.—This is a summary of data supplied by H. T. Easterly, General Superintendent. The experiments deal with irrigation, cultivation and manuring of cane lands.—*C. Rumbold.*

6340. ANONYMOUS. Dhall as a Natal farm crop. Notes on its cultivation. *South African Sugar Jour.* 8: 239. 1924.—Some dhall or dhol, planted on a good soil at Empangeni grew 6 feet in a few months and produced a big crop of seed. Cattle liked it. An analysis made by the Veterinary Research Department showed that its leaves equal in food value those of lucerne. Dhol (*Cajanus indicus*) or English pigeon pea, grows 6 feet or more high, and has pods 3 to 5 inches long with 3 to 5 seeds. It resists drought to a remarkable degree and is recommended as a restorative crop in rotation. In India it is often grown as a mixed crop together with sorghum, gingelly, cotton and rice. The seed are used as food, the leaves as fodder, and the stalks as fuel.—*C. Rumbold.*

6341. ANONYMOUS. *Petite encyclopedie de la vie rurale.* [*Encyclopedia of rural life.*] 512 p., illus. Larousse: Paris, 1923.

6342. ANONYMOUS. The world's yield of wheat. *Jour. Dept. Agric. Victoria* 20: 661. 1922.—It is estimated that the yield for the world was about the same in 1922 as in 1921.—*Wm. E. Lawrence.*

6343. ALEXANDER, WILLIAM PATTERSON. The irrigation of sugar cane in Hawaii. 109 p., illus. Exp. Sta. of the Hawaiian Sugar Planters' Assoc.: Honolulu, 1923.—Over 50% of the sugar cane area in the Hawaiian Islands depends on irrigation. The first large ditch was finished in 1878; to-day the irrigation works are unparalleled in other sugar countries. The profitable production of sugar cane depends on the skill used in irrigation. The water is obtained from mountain sources on the rainy side of the Islands and from artesian wells, and electricity developed by hydroelectric plants is being used in the pumping plants. The elements in an irrigation system on a sugar plantation are: (1) main ditches delivering water to the fields; (2) straight ditches running down grade; (3) level ditches taking water off

laterally; (4) water courses, small improvised channels that hold the water applied by one man, and (5) furrows, at right angles to the water courses in which the cane grows. The method of applying water varies according to (1) the water supply, whether steady all the year or seasonally limited, whether fresh or saline; (2) the amount and kind of land available; (3) the type of soil; (4) slope of field; (5) conditions of field and cane, and (6) kind of cane. It is calculated that on an average 6,205,885 gallons (1 acre foot = 325,850 U. S. gallons) of water per acre are required to bring to maturity a cane crop, having an average yield of 6.66 tons of sugar. Seepage losses in the ditches has led to the trial of various methods of lining ditches, concrete proving most profitable. Soil moisture investigations show that on the warm lowlands of Oahu Island, saturation of the soil is reached at a little over 30% soil moisture. In warm weather the wilting point of cane occurs when soil moisture is below 21%. In the winter months this percentage may drop to 20%. The data show practically no capillary movement of water from lower to upper strata of soil. Drying out proceeds downward, being rapid in the first 2 feet. There is a tendency for gravity to pull the water downward for 48 hours after irrigation water is applied. In winter, with a slight rainfall, the soil moisture can be maintained for almost three months. During June, July, and August, with good drainage the growth of the cane is in direct proportion to the amount of water it receives. Of artificial factors influencing the ripening of cane, irrigation is the most important. There is a crucial point in its growth when irrigation should stop and allow a gradual drying out of the soil. The data collected show that it depends on the individual field (soil drainage), season, weather (rainfall, wind, temperature), and variety of cane. Experiments indicate that Rose Bamboo requires less water for maximum yield than Iahaina cane; H-146 required more water than Yellow Caledonia, D-1135, and H-109 per ton of sugar produced. H-109 gave the highest yield per million gallons used. Drought resistance of varieties has not been fully tested experimentally. Plantations using saline water practice over-irrigation occasionally to prevent the accumulation of salt in the soil. Other fields have had a top layer of earth $\frac{1}{2}$ – $\frac{3}{4}$ inch thick removed from time to time. Some plantations have used saline water for 25 years without bad results. Manuring fields by plowing under cane trash is not practiced extensively. It is a general custom to apply fertilizer such as nitrate of soda and sulphate of ammonia in the irrigation water. Illustrations, diagrams and tables supplement the text.—*C. Rumbold*.

6344. AUSTRALIA. INSTITUTE OF SCIENCE AND INDUSTRY. A classification and detailed description of the barleys of Australia, being the second report of the special committee on seed improvement. Publ. under the authority of G. H. KNIBBS, Director. Bull. 22. 33 p., illus. A. J. Mullett: Melbourne, 1922.

6345. AUSTRALIA. INSTITUTE OF SCIENCE AND INDUSTRY. A classification and detailed description of the oats of Australia, being the third report of the special committee on seed improvement. Publ. under the authority of G. H. KNIBBS, Director. Bull. 23. 31 p. A. J. Mullett: Melbourne, 1922.

6346. BALDWIN, P. E. The reclamation of sandy lowlands. New Zealand Jour. Sci. and Tech. 6: 169–173. 1923.—The paper discusses the bringing into profit the sandy areas along the New Zealand coast. The modern system is to grass the sand-drifts with cocksfoot, clover and crested dogstail. Cut manuka (*Leptospermum scoparium*) is laid over the sand-drifts, with the butts facing up-wind. Practical details are given.—*H. H. Allan*.

6347. BEAUVERIE, J. The critical period of wheat. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 199–201. H. Veenman & Sons: Wageningen, 1923.—[See Bot. Absts. 12, Entry 5293.]

6348. BECKURTS, S. M., UND O. LÜNING. Beitrag zur Bestimmung des Ausmahlungsgrades von Roggenmehl. [Report on the determination of grade of rye flour.] Zeitschr. Untersuchung Nahrungs- u. Genussmittel 44: 41–47. 1922.

6349. BEHRE, A., A. DÜRING, UND H. EHRECKE. Stärkesirup und -zucker aus Kartoffeln und Mais. [Glucose from potatoes and corn.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 242–248. 1921.

6350. BRENCHEY, WINIFRED E. Effect of weight of seed upon the resulting crop. *Ann. Appl. Biol.* 10: 223-240. 1923.—Results of experiments with peas and barley grown in nutrient solutions support the view of the advantage generally to be gained from sowing heavy, well-filled seeds, especially in the case of short-lived crops. A steady rise in dry weight of plants was obtained as the initial weight of the seed increased, both with an abundant and a limited food supply. The efficiency index (rate per cent, increase per day) fell gradually as the weight of the seed rose. However, with annual crops, harvesting occurs before the initial advantage of the heavier seed has disappeared. While the relative development of shoot and root is influenced somewhat by the initial weight of the seed, this may vary with the species and the amount of available food supply.—A. W. Henry.

6351. BURNS, W. Grassland ecology. *Agric. Res. Inst. Pusa Bull.* 150. 18-21. 1923.

6352. BURT, B. C. Fodder growing in relation to cotton cultivation. *Agric. Res. Inst. Pusa Bull.* 150. 36-37. 1923.

6353. CALL, L. E., AND R. E. GETTY. The eradication of the bindweed. *Kansas Agric. Exp. Sta. Circ.* 101. 1-18. 9 fig. 1923.—Methods for the eradication of large and small areas of *Convolvulus arvensis* in Kansas are suggested.—L. E. Melchers.

6354. CHAKRAVARTY, J. N. A fodder problem of the Surma Valley. *Agric. Res. Inst. Pusa Bull.* 150. 57. 1923.

6355. CHARLTON, J. The prevention of nuisances caused by the parboiling of paddy. *Agric. Res. Inst. Pusa Bull.* 146. 1-38. 1923.—A method of steeping paddy (unhusked rice grains) is described. Anaerobic bacteria are said to be "chiefly responsible for the nuisances." As preventives it is recommended (1) that the steeping water be acidified and (2) that it be not lower than 60°C. in the coldest portions of the tanks.—H. M. Jennison.

6356. CLOUSTON, D. The fodder problem in the Central Provinces. *Agric. Res. Inst. Pusa Bull.* 150. 46-52. 1923.

6357. COLE, E. HEARST. Some problems of fodder production in the Punjab. *Agric. Res. Inst. Pusa Bull.* 150. 28-31. 1923.

6358. CONGRÈS DE LA PRODUCTION COLONIALE, MARSEILLE. *Compte-rendus et rapports. Congrès des céréales, 27 au 30 septembre 1922.* [Reports of the congress on cereals.] 254 p. Institut coloniale: Marseille, 1922.

6359. CONGRÈS DE LA PRODUCTION COLONIALE, MARSEILLE. *Mémoires et rapports sur les matières grasses.* [Memoirs and reports on fats and oils.] 2 vol. 468 p. Institut coloniale: Marseille, 1922.

6360. COUR, D. LA. Hvorledes kan en Vejrtjeneste ved Meteorologisk Institut vaere Nytte for Landmanden? [How can weather service of the Meteorological Institute aid the farmer?] *Tidsskr. Landokonomi* 3: 130-159. 1924.—This is an address delivered by the director of the Meteorological Institute before the Royal Danish Agricultural Society on January 24, 1924.—Albert A. Hansen.

6361. DOSCAS, A. E. C. A revival of Patchouli cultivation in Johore. *Malayan Agric. Jour.* 12: 12-13. 1 pl. 1924.—The cultivation of *Pogostemon patchouli* and methods of drying and oil extraction by steam distillation are described.—R. E. Holttum.

6362. DRĂGAN, I. C. Repartizarea apei în semântă. [Distribution of water in seeds.] *Viața Agric. București* 13: 111-116. 1922.

6363. FERRER, L. G., AND R. B. ESPINO. A study on the germination of abaca seeds. *Philippine Agric.* 12: 101-109. 1923.—Seeds of abaca (*Musa textilis*) required 11-24 days before they began to germinate, the germinating period lasted 18-52 days, and 20 to 89% germination was obtained.—Sam F. Trelease.

6364. FREAR, WILLIAM, E. K. HIBSHMAN, AND OTTO OLSON. The cigar tobacco industry in Pennsylvania. *Bull. Pennsylvania Dept. Agric.* 53: 1-90. Fig. 1-38. 1922.—This is a handbook for tobacco growers and manufacturers, giving salient points as covered by the following captions: historical sketch, production statistics, types of tobacco, cultural methods, preparation of seed, seed beds and sterilization, care of seed beds, field preparation, planting, cultivation, insects, plant diseases, seed selection, topping, suckering, ripening, harvesting, care of seed stalks, curing, stripping, marketing, manufacturing, farming systems, financing, organization, and research.—C. R. Orton.

6365. GELODI, ALFREDO. Il tabacco, la sua coltura agricola e industriale. Nuovi essiccatoi a fermentazione con applicazioni tecniche per la formazione dei colori. [Tobacco in agriculture and industry.] xv + 240 p. *Portrait*. Tip. P. Nero: Bologna, 1922.

6366. GEORGI, C. D. V. Lemongrass oil. *Malayan Agric. Jour.* 12: 83-85. 1924.—A short account is given of the cultivation of *Cymbopogon flexuosus* Stapf, and the extraction, yield and uses of the oil obtained from it.—*R. E. Holttum*.

6367. GEORGI, C. D. V. The utilisation of Citronella grass planted as a preventive of soil wash. *Malayan Agric. Jour.* 12: 7-11. 1924.—Notes are given on the cultivation of *Cymbopogon nardus* Rendle and *C. winterianus* Jowitt, and the method of extraction of the oil from the leaves by steam distillation is described. The yield of oil is about 0.5 to 0.6% of fresh weight, or 60 pounds per acre at each cutting.—*R. E. Holttum*.

6368. GOFFI, G. P. Notes on maintenance rations. *Agric. Res. Inst. Pusa Bull.* 150. 22-27. 1923.

6369. GRESS, E. M. An explanation of the Pennsylvania seed law. *Bull. Pennsylvania Dept. Agric.* 4th: 1-31. 1921.—This is a popular bulletin for the information of farmers and seedsmen presenting the requirements, objects, and functions of the new seed law enacted in 1921. It also prescribes the forms of tags to be used in labeling seeds offered for sale.—*C. R. Orton*.

6370. HENDERSON, G. S. Notes on fodder growing on the Pusa Farm. *Agric. Res. Inst. Pusa Bull.* 150. 12-17. 1923.

6371. HILLE, EMIL. Zur Förderung der Oedlandkultur. [Waste land culture.] *Jour. Landw.* 70: 129-137. 1922.

6372. HOWARD, A. An improved method of lucerne cultivation. *Agric. Res. Inst. Pusa Bull.* 150. 32-35. 1923.

6373. INTERNATIONAL INSTITUTE OF AGRICULTURE. Oleaginous products and vegetable oils: production and trade. *Sup. Roy. 8vo, xxxiv + 511 p.* International Institute of Agriculture: Rome, 1923.

6374. JOSHI, N. V. Comparative manurial value of the whole plants and the different parts of green manures. *Agric. Res. Inst. Pusa Bull.* 141. 14 p. 1922.

6375. KULKARNI, L. B. Improvement of grazing areas in the Bombay Presidency. *Bull. Dept. Agric. Bombay Presidency* 112. 54 p., 4 pl. 1923.—The purpose of the bulletin is threefold: To show (1) how grazing areas can be improved, (2) how they should be managed, and (3) how the chief "mal" lands of the Deccan can be utilized. Comment is made on important native forage plants—especially grasses. Some of the valuable native grasses are Marvel grass (*Andropogon annulatus*), *Andropogon caricosus* and its var. *mollicomus*, *A. monticola*, *A. pertusus*, and *A. purpureo-sericeus*, Rhodes grass (*Chloris gayana*), *Ischaemum sulcatum* (an annual), and *Iseilema wightii*. Sowings with a single species in artificial re-seeding experiments were not successful. In mixed sowings better results were obtained: The annuals and legumes came up first and yielded heavily, but disappeared gradually as the perennial grasses became established. Sown areas were protected by hedges of green Babul (*Acacia arabica*) branches. A number of chemical analyses of forage species are given. There is a short chapter on the necessity for suppressing *Andropogon* (*Heteropogon*) *contortus*. Germination test percentages are furnished for numerous species. The author allocates important native forage species in the following categories: (1) Continuity—(a) perennials, (b) annuals; (2) feeding values—(a) excellent, (b) good, (c) fair; (3) drought-resistance; (4) growth rapidity; (5) yield volume; (6) capacity to grow on poor soils; (7) capacity to stand close grazing. The management of a *kuran* (grazing area) is to be based on a block system, where a form of rotation grazing is to be applied. Grazing when the soil is wet and saturated is to be avoided, and no grazing is to be allowed on sown areas until the cover is established. When the yield decreases the *kuran* is to be broken and reseeded again. Useful trees (such as Babul) are to be planted in rows, since their thick growth reduces the quality of the grass.—*W. A. Dayton*.

6376. KUNJAN PILLAI, N. The fodder problem in Travancore [South India]. *Agric. Res. Inst. Pusa Bull.* 150. 38-40. 1923.

6377. LANDER, P. E., B. H. WILSDON, AND M. MUKAND. A study of the factors operative in the value of green manure. Agric. Res. Inst. Pusa Bull. 149. 1-23. 2 *diagr.* 1923.—The practice of green manuring is reported to be a common agricultural operation in many parts of India. The work presented covers a period of 5 years and results on the whole appear to show that the response to green manuring is much greater in sandy than in stiff soils. Increased yield, it is said, comes mainly as result of improvement in the physical texture of the soil due to the addition of green manure. The authors state that in certain areas non-leguminous green dressings are as effective as leguminous.—H. M. Jennison.

6378. LEPPAN, H. D., AND G. J. BOSMAN. Field crops in South Africa. 358 p., 28 *illus.* Central News Agency, Ltd.: Johannesburg, 1923.—This is No. 1 of a proposed series of South African agricultural publications similar to books on farm crops published in the U. S. A., and it is evidently intended as a text for use in agricultural schools and colleges. The subject is treated under 21 chapters, including: historical and general surveys; agro-geographical conditions in relation to crop distribution in South Africa; soil management, including tillage, irrigation, drainage, fertilizer practice, green manuring and weed control; rotation of crops; and dry-land farming. The rest of the book is devoted to a discussion of individual crops. The principal summer crops are maize, sorghum, potatoes, lucerne or alfalfa, cotton, tobacco, and sugar cane. The principal winter crops are wheat, oats, barley, and rye. Miscellaneous crops are discussed under the headings: grasses and millets; root and allied crops; flax, buckwheat, sunflowers, and pumpkins; and minor crops. The authors have included considerable material from American publications and some from what are evidently European sources.—H. N. Vinall.

6379. LIVINGSTON, B. E. [Rev. of: WEAVER, JOHN E., FRANK C. JEAN, AND JOHN W. CRIST. Development and activities of the roots of crop plants: a study in crop ecology. vi + 117 p., 14 *pl.*, 42 *fig.* Carnegie Inst. Publ. 316. 1922 (see Bot. Absts. 11, Entry 4694).] Science 56: 283-285. 1922. [See also Bot. Absts. 12, Entry 3040.]

6380. LUTZEN, M. WINTHER. Lidt om Landbruget paa Faeroerne. [Agriculture on the Faroe Islands.] Tidsskr. Landokonomi 2: 95-105. 1924.—The soil, although thin, is a black clay loam. During the growing season (May-September) there is an excess of rainfall. The principal crop is hay, which grows luxuriantly, but, with the exception of oats, grain crops grow poorly. The temperature is usually low, July being the warmest month. Potatoes grow well and are extensively grown, although *Phytophthora infestans* takes heavy toll during excessively wet seasons. Other crops, from which fair yields are obtained, are currant, gooseberry, blackberry, raspberry, carrot, cabbage, lettuce, radish, cauliflower and rhubarb.—Albert A. Hansen.

6381. MARTIN, R. D., AND H. F. LOOMIS. Summer irrigation of Pima cotton. Jour. Agric. Res. 23: 927-946. 4 *fig.* 1923.—Experiments were conducted at Sacaton, Ariz., to determine the effects of different frequencies of irrigation during July and August on Pima Egyptian cotton that had reached a normal early fruiting stage. As a general result of the experiment it was determined that the different frequencies of irrigation did not cause any consistently significant difference in the growth or yield of the plants.—No consistently different rates of flowering or of shedding of young bolls resulted from any of the different kinds of treatment. A wide range in the daily flowering production occurred. The rate of shedding of young bolls also varied from day to day, though on only a few days was there a consistent behavior throughout all the borders. No correlation could be definitely established between these fluctuations and any factors which might be supposed to influence this phenomenon. No consistent increase or decrease at a regular interval after an irrigation was found either for flowering or shedding of young bolls. Shedding of young bolls was greatest at 4-14 days after flowering, the interval varying only slightly between borders.—This experiment indicates the importance of bringing the plants to a normal fruiting condition before summer irrigations begin. When this normal fruiting condition is attained, the summer irrigation problems are simplified, since the plants are not so easily forced into rank growth by the application of water in excess of the actual requirements.—R. D. Martin.

6382. MATSON, J. Quality deficiency in the fodder supply. Agric. Res. Inst. Pusa Bull. 150. 9-11. 1923.

6383. MEUNIER, J. De la production de la graine de betterave sucriere dans le departement des Basses-Pyrenees. [Sugar beet seed production in the Basses-Pyrenees.] 8 vo, 212 p. P. Renouard: Paris, 1922.

6384. MEYER, L. Neuzeitliche Stickstoffdüngung. [Modern nitrogen fertilization.] 8 vo, 51 p. J. Neumann: Neudamm, 1922.

6385. MILLIGAN, S. Some of the wider aspects of the fodder question in India. Agric. Res. Inst. Pusa Bull. 150. 1-4. 1923.

6386. MITRA, S. K. Broom corn—a new fodder crop [for South India]. Agric. Res. Inst. Pusa Bull. 150. 58. 1923.

6387. MITRA, S. K. Experiments with lucerne in the plains of Sylhet. Agric. Res. Inst. Pusa Bull. 150. 37. 1923.

6388. OLARU, D. A. Experimentele cu îngrășămintele manganice în diferite țări. [Experiments with manganic fertilizers in different countries.] Viața Agric. București 13: 137-143. 1922.

6389. OLSON, OTTO. Results of tobacco experimental work in Pennsylvania from 1912 to 1922. Pennsylvania Agric. Exp. Sta. Bull. 179. 1-27. 1923.—This bulletin reviews the cooperative experimental work conducted chiefly in Lancaster and Clinton Counties by the Pennsylvania Agricultural Experiment Station, the Office of Tobacco Investigations, U. S. Bureau of Plant Industry and the Lancaster, York and Clinton County Tobacco Growers Associations. Results are presented in a semi-popular manner upon bulk sweating, steam sterilization of seed beds, fertilizer experiments on seed beds, seed cleaning, rate of seeding of tobacco beds, fumigating tobacco beds for aphids and indirectly for mosaic control, fertilizer experiments in Lancaster, York and Clinton Counties, planting distances and topping heights for cigar leaf tobacco, influence of time of topping upon distances between leaves on stalks, suckering experiments, tobacco root-rot experiments, seedleaf and Havana seed strain test, variety tests, seed breeding, reducing the nicotine content of tobacco, the production of tobacco of high nicotine content, curing experiments with artificial heat to prevent pole burn; and testing the possibility of redrying cigar leaf tobacco as a control for black rot.—C. R. Orton.

6390. OTTO, R. Düngerlehre. [The theory of fertilizers.] 8 vo, vii + 86 p. E. Ulmer: Stuttgart, 1922.

6391. PARODI, LORENZO R. Las plantas forrajeras indigenas y cultivadas de al Republica Argentina. Primera contribucion. [Native and cultivated plants of the Argentine Republic.] 228 p., 43 pl., 76 col. charts. University of Buenos Aires, Department of Agronomy and Veterinary Science: Buenos Aires, 1923.—This report contains a foreword by the Director, R. J. CARCANO, prologue by L. HAUMAN, preface by F. REICHERT, and an introduction discussing the investigation of the chemistry of forage crops by FEDERICO REICHERT AND ROGELO A. TRELLES.—A description, brief history, chemical analysis, interpretation of analyses, and colored charts showing ratios of constituents are given for the following species: *Agrostis alba*, *Medicago sativa*, *Andropogon barbinodis*, *A. Hassleri*, *A. saccharoides*, *A. sorghum* var. *sudanensis*, *Aristida adscencionis*, *A. mendocina*, *Arrhenatherum elatius*, *Avena elatior*, *A. sativa*, *Axonopus compressus*, *Bouteloua curtipendula*, *Briza triloba*, *Bromus unioloides*, *B. inermis*, *Calamagrostis montevidensis*, *Cenchrus pauciflorus*, *C. tribuloides*, *Chloris gayana*, *C. polydactyla*, *Cynopogon radiatus*, *Cynodon dactylon*, *Dactylis glomerata*, *Digitaria sanguinalis*, *Distichlis scoparia*, *Elymus* sp., *Eragrostis pilosa*, *Phalaris stenoptera*, *Holcus lanatus*, *Hordeum murinum*, *H. vulgare*, *Lolium multiflorum*, *Oryzopsis bicolor*, *Setaria italica*, *S. geniculata*, *S. Caespitosa*, *S. verticillata*, *Panicum Bergii*, *P. decipiens*, *Rottboellia compressa*, *Poa annua*, *Paspalum larranagoi*, *P. dilatatum*, *P. Buckleyanum*, *P. notatum*, *Pennisetum purpureum*, *Stipa brachychaeta*, *S. hialina*, *S. papposa*, *S. setigera*, *Trifolium repens*, *Trichloris mendocina*, and *Vicia* Sp.—Mary R. Burr.

6392. PIEDALLU, ANDRE. Le sorgho, son histoire, ses applications. [History and utilization of sorghums.] 368 p. 16 pl., 68 fig. Société d'editions geographiques maritimes et coloniales: Paris, 1923.—The book contains a rather extended discussion of the sorghums,

based largely on a compilation of information from other publications. The subject matter is divided into 22 chapters under the following headings: Botanical description, history, botanical history, geographical distribution, culture of sorghums for forage, study of the toxic principle of sorghum, sugar and sirup of sorghum, the wax (bloom) on the stems and leaves of sorghum, utilization of sorghum in paper manufacture, cultivation of sorghum for grain, employment of sorghum grain in feeding animals, sorghum grain as human food, the grain and flour of sorghum (chemical composition, etc.), varieties, culture, etc., of broom-corn, ornamental sorghums in horticulture, beer or malt liquor from sorghum, distilled liquors (alcohol) from sorghum, study of the coloring matter in the sweet sorghums, technique and uses of sorghum dyes, parasites of sorghum, conclusion, and bibliography. The history and bibliography ought to be especially useful to students of sorghums.—*H. N. Vinall.*

6393. PIETERS, A. J. **Clover problems.** Jour. Amer. Soc. Agron. 16: 178-182. 1924.—An address. The culture of red clover in the eastern U. S. A. is shown to be gradually declining, while the acreage for cereals is increasing. Since red clover is by far the best dual-purpose legume known and constitutes a large percentage of the legumes grown in rotation, the ideal ratio 1 : 3 between legumes and non-legumes is continually farther from realization. The declining popularity of red clover is due to increasing difficulty in growing the crop because of poor soil conditions brought about chiefly by depletion of lime, organic matter or phosphorous. The remedy can easily be determined by local experimentation. Recently, unadapted seed has been found to cause clover failure, plants from Italian seed being particularly unreliable. Diseases, more or less closely associated with source of seed, have caused serious losses southward. Investigation of the latter factors is being continued.—*L. W. Kephart.*

6394. POTASH IMPORTING CORPORATION OF AMERICA. **Better tobacco.** 32 p., illus. The Potash importing corporation of America: New York, 1924.

6395. PRJANISCHNIKOW, D. N. **Die Düngerlehre.** [The theory of fertilizers.] Translated from 5th Russian ed. by M. VON WRANGELL. xii + 450 p. Paul Parey: Berlin, 1923.

6396. QUEREAU, F. C. **Shall the rice farmer use commercial fertilizer?** Rice Jour. 27: 10-11. 1924.—Experiments show that on badly worn rice lands having production reduced to 6 barrels per acre, the use of phosphoric fertilizer increases the yield by 2½-5 barrels per acre. But if acid phosphates are used for 2 or 3 years, water grasses develop and check the rice. When the yield falls to 7 barrels or less the quality is also poor. It may be that a non-acid phosphate would eliminate this difficulty.—Texas is reported 2nd and Louisiana 1st in rice production in the U. S. A.—*L. Pace.*

6397. QUINTUS, R. A. **The cultivation of sugar cane in Java.** An elementary treatise on the agriculture of sugar cane in Java, more especially on its cultivation on the Krian Estate. 164 p., 38 pl. Norman Rodgers: London, 1923.—The book originated in planting instructions used on the "Krian" estate and the practices described usually refer to local conditions. Java planters can not own land, but may lease its partial use for 21½ years, consequently they practice very intensive cultivation of the soil, their methods resembling those used in nurseries rather than in agriculture.—There are 393,750 acres planted in sugar cane on 183 estates, the sugar area extending from sea level to 1,312 feet above. Culture is dependent on the rainy and dry seasons. The rainy season (November to May), when the cane should grow, usually has enough rain. The dry season (May to October) is the uncertain and important period. The best planting time is from May through August. The government regulates irrigation, methods and practices of which are discussed. Details are also given of the triennial rotation, fertilization, and cultural methods practiced.—In the growing season new internodes are formed every 5 to 7 days, the canes growing principally by night. Aside from the effect of rains there is a periodicity of growth—a slowing down in January and the following months—inherent in the plants.—Experiment has shown that selection of plant cane based on externally perceptible qualities such as girth and size of internodes produces no effect, neither does selection based on percentage of sugar. The only point to be considered in plant cane material is that it should be healthy. Cane diseases do not cause much damage as there is no ratooning, and rotation of crops is practiced. Six diseases of the stem of cane are distinguished, 2 of the sheath, 6 of the leaves and 1 of the roots.—*Sereh*

is combated by planting new resistant varieties and by growing the plant cane in mountain nurseries where the disease does not develop. Yellow-stripe infests cane growing in the mountains, but not in the lowlands. To combat this disease plant canes are selected from the young tops of full-grown, healthy, crushing canes on the same plantation. All sets of planting material are prepared under supervision in the chopping sheds of the factory, and are inspected for disease, chopped, selected, and disinfected with Bordeaux mixture or tar. —Growth of the cane is measured and it is manured and watered accordingly. Maturity of the cane is watched by testing selected samples, and harvesting is done by hand, the cane stools being dug out. At this time the selected plant cane is cut. Harvesting is regulated by the maturity of the cane, and transportation is carried out so that the cut cane does not wait long before being ground.—Cost of production has risen, due to increased salaries and cost of manure, and to less capable labor.—*C. Rumbold*.

6398. RAJHAMI, M. Some suggestions for the improvement of fodder and forage in the Madras Presidency. *Agric. Res. Inst. Pusa Bull.* 150. 45. 1923.

6399. REW, HENRY, AND E. J. RUSSELL. The possibilities of British Agriculture. 32 p. John Murray: London, 1923.

6400. ROEBUCK, A., AND P. S. BROWN. Correlation between loss of leaf and damage to crops in late attacks on wheat. *Ann. Appl. Biol.* 10: 326-334. 1923.—Approximately 50% loss in the crop-yield was caused by total defoliation at the time of earing, slightly less by loss of half of each leaf, and a greater loss in the aggregate from loss of the leaves on the lower half of the culm. The loss in yield was proportionately less as the treatments were executed later and later in the season up to the time of ripening.—*J. H. Craigie*.

6401. ROSENFELD, ARTHUR H. Rotation in the cane fields. Beneficial results from alfalfa and maize. *South African Sugar Jour.* 8: 217-221. 1924.—Crop rotation experiments made at the Tucuman Sugar Experiment Station in Argentina are described.—*C. Rumbold*.

6402. SAGNIER, HENRY. Culture de la betterave et production du sucre. [Beet culture and sugar production.] *Compt. Rend. Acad. Agric. France* 1920: 899-902. 1920.

6403. SALAMAN, REDCLIFFE N. The determination of the best method for estimating potato yields, together with a further note on the influence of size on the character and yield of the potato. III. *Jour. Agric. Sci.* 13: 361-389. *Fig. 1-8*. 1923.—This is a continuation of studies previously reported with potatoes on relation of size to yield, and on some details of plot experimentation technique. A number of recommendations are made with respect to number of tubers per plot; replications; and size, shape and spacing of plots. Seed tubers weighing about 1.5 ounces are best for producing a crop of highest monetary value. Seed tubers weighing 1-1.3 ounces are less likely to be infected with virus diseases that have been present in the parent stock, than tubers of smaller weight. The same amount of heavy ware was produced from cut sets as from whole sets of corresponding weights. Barley Bounty variety was used.—*S. Lomanitz*.

6404. SALMON, S. C. Seeding small grains in furrows. *Kansas Agric. Exp. Sta. Tech. Bull.* 13. 1-55, 16 fig. 1924.—The investigations reported seem to indicate that losses of winter cereals from winter killing and soil blowing may be prevented by seeding in furrows somewhat deeper and farther apart than generally results from a grain drill. It has been observed that marked protection from winter killing results from snow which is retained and not allowed to drift away, thereby protecting plants from cold and drying winds. Temperature records show that a marked difference in minimum winter temperatures favors the furrow method. Studies are still in progress and, therefore, final conclusions are not made as to the scope of adaptability and practicability of this method. It is pointed out that some areas in Kansas would not benefit by following the furrow method. Experimental records are too meagre to permit any conclusions regarding the value of this method for spring grains. A drill is being perfected to overcome some of the difficulties presented by the ordinary types.—*L. E. Melchers*.

6405. SCHOLLER, F. Berechnung des Ausmahlungsgrades der Mehle. [Calculation of the grade of flours.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 44: 348-351. 1923.

6406. SEYMOUR, G. Potato-growing in Australia. 8 vo, 124 p. Whitcombe and Tombs: London, 1922.

6407. SHARMA, L. C. The fodder problem of the United Provinces. Agric. Res. Inst. Pusa Bull. 150. 53-56. 1923.

6408. SMITH, W. The fodder needs of India from a dairy point of view. Agric. Res. Inst. Pusa Bull. 150. 5-8. 1923.

6409. SOUTH, F. W., AND F. BIRKINSHAW. Summary of the work of the Inspection Division for the first three quarters of 1923. Malayan Agric. Jour. 12: 32-50. 1924.—This paper deals largely with reports of the local prevalence of various pests and diseases of rubber, coconuts and rice and control measures adopted, together with general agricultural notes concerning these and other crops.—*R. E. Holttum*.

6410. SPRING, F. G. The Soya bean (*Glycine hispida*). Malayan Agric. Jour. 12: 55-57. 1924.—This is an account of the cultivation of this plant by Chinese in Pahang.—*R. E. Holttum*.

6411. STRAKOSCH, GEORG. Der Zuckerrübenbau in den Vereinigten Staaten. [Sugar beet industry in the U. S. A.] Weiner Landw. Zeitg. 74: 61-62. 1924.—The author discusses the information gained during a personal study of the sugar industry in North America, including Central America, as it applies to improvement of this industry in Austria. Methods of culture and protection against pests, as well as economic features of sugar-beet production are discussed.—*F. Weiss*.

6412. TAYLOR, P. R. Standard grades for apples, potatoes and wheat. Bull. Pennsylvania Dept. Agric. 72: 1-14. 1924.—Rules and regulations providing for standard grades of apples, potatoes, and wheat, definitions of grade terms, enforcement, and violations are discussed.—*C. R. Orton*.

6413. UNNIKRISHNA MENON, K. Elephant grass or napier grass (*Pennisetum purpureum*) [in South India]. Agric. Res. Inst. Pusa Bull. 150. 44-45. 1923.

6414. UNNIKRISHNA MENON, K. The improvement of fodder and forage in the Coimbatore District. Agric. Res. Inst. Pusa Bull. 150. 41-43. 1923.

6415. VENABLE, REID. Selected list of references relating to irrigation in California. California Agric. Exp. Sta. Circ. 260. 62 p. 1923.

6416. WALLACE, H. A. What is in the corn judge's mind. Jour. Amer. Soc. Agron. 15: 300-304. 1923.—Several experienced corn judges scored 500 ears of corn on the basis of what they thought the relative yields would be, the ears then being planted one row to an ear. The judges' score card and the yield score card are given. There was poor correlation between the judges' score and the yield score, too much emphasis being laid upon length of ear and fancy points and not enough upon sound healthy kernels.—*F. M. Schertz*.

6417. WALSTER, H. L. Sweet clover as a hay crop. Jour. Amer. Soc. Agron. 16: 182-186. 1924.—An address. Despite certain weedy characteristics, sweet clover is a valuable hay plant, especially south of the Northern Great Plains where its weediness can be controlled. In northern regions it is more useful for pasture. Directions are given for making the hay, and the relative value of different varieties is discussed.—*L. W. Kephart*.

6418. WOLFE, T. K. Soybean culture. Virginia Agric. Exp. Sta. Bull. 235. 1-32. 14 fig. 1924.—This is a general discussion of soybean culture with data on yield as influenced by cultural practices, and on yield of varieties.—*F. D. Fromme*.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

CARROLL W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 6415, 6439, 6474, 6554, 6560, 6591, 6631, 6709)

6419. ANONYMOUS. Leonard Cockayne. New Zealand Jour. Sci. and Tech. 2: 231-234. 1 pl. 1919.—An account is given of the horticultural and botanical activities of Dr. Leonard Cockayne, with a brief sketch of the more important of his books and published papers. "Not only has he thus made notable contributions to knowledge, but he has profoundly influenced the younger botanists of New Zealand in the direction of ecology."—*H. H. Allan*.

6420. BAKER, C. F. The output of the College of Agriculture. Philippine Agric. 12:

261-292. 1923.—This article contains a bibliography of 591 contributions published from 1909 to 1923 by the faculty and students of the College of Agriculture, Los Baños, Philippine Islands. Approximately 300 of the contributions deal with botanical sciences.—*Sam F. Trelease.*

6421. BOHN, GEORGE. Jacques Loeb (1859-1924). *Compt. Rend. Soc. Biol.* 90:728-730. 1924.—After reviewing the life and contributions of Jacques Loeb, the author concludes: "There was something of the apostle in Jacques Loeb: he didn't work merely for his personal satisfaction but tried to make the public understand the result of his researches and to convince them that we are only chemical machines. 'If we struggle for justice and truth, if we sacrifice our life for an ideal, we owe this to our instincts which, like the form of our bodies, are determined in us chemically.' Loeb was led through his entire life by this idea and it is that which makes the unity, the greatness, and the beauty of his work."—*Oran Raber*

6422. FREAR, WILLIAM, AND THOMAS I. MAIRS. Author index of the publications of the Pennsylvania Agricultural Experiment Station. *Pennsylvania Agric. Exp. Sta. Bull.* 180. 1-56 p. 1923.

6423. HASTINGS, G. T. Linnaeus. [Rev. of: JACKSON, BENJAMIN DAYDON. *Linnaeus, the story of his life, adapted from the Swedish of Theodore Magnus Fries.* xv + 416 p. H. F. & G. Witherby: London, 1923 (see Bot. Absts. 13, Entry 4830).] *Torreyia* 24: 33-34. 1924.—This is the most complete biography of Linnaeus in English. Fries' 2 volumes have been condensed and new material added.—*J. C. Nelson.*

6424. MANNS, T. F. John Asbury Elliott. *Phytopathology* 14: 129-131. *Portrait.* 1924.—A brief biography and a list of published works are given.—*B. B. Higgins.*

6425. RASMUSSEN, FRED. The agricultural experiment station and the state. *Bull. Pennsylvania Dept. Agric.* 5⁶: 1-11. 1922.

6426. RUDMANN, C. F. The Raysens of Corinth. *Baking Technology* 3: 85-87. 1924.—This paper discusses the derivation of the name "raisin," concluding that it comes from the Latin "racemus," meaning a "cluster." Biblical references to raisins and grapes are noted. The history of the culture of raisins and their use as an article of commerce is given briefly from Greek and Roman times to the present.—*Carleton R. Ball.*

6427. S., A. C. Herb lore in early Ireland. *Pharm. Jour.* 109: 506-507. 1922.—From the texts of old Irish prescriptions of the 10th and 14th centuries quoted herein, the shamrock or "little trefoil" is not certainly identifiable, but the *shamrog* of the herbals seems to be the wood sorrel (*Oxalis acetosella*).—*E. N. Gathercoal.*

6428. TSCHERMAK, ERICH. Zum 100 Geburtstag Gregor Mendels. [The centenary of Mendel's birth.] *Umschau* 26: 449-453. 1922.—This is a review of Mendel's life and work, giving dates of principal events.—*D. F. Jones.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 6341, 6508, 6532, 6706, 6826)

6429. ANONYMOUS. Natural history. [Rev. of: COSTANTIN, J., et F. FAIDEAU. *Histoire naturelle illustrée; les plantes.* (Illustrated natural history; plants.) 2 + 315 p., 26 pl., map. Librairie Larousse: Paris, 1922.] *Nature* 113: 119. 1924.

6430. BOWEN, MRS. EZRA. The story of the oak tree. 127 p., illus. The Chemical Publishing Co.: Easton, Penna., 1924.

6431. GAGER, C. STUART. [Rev. of: SINNOTT, E. W. *Botany: principles and problems.* xix + 385 p., 240 fig. McGraw-Hill Book Co.: New York, 1923 (see Bot. Absts. 13, Entry 88).] *Science* 59: 319-320. 1924.

6432. KENDALL, ARTHUR ISAAC. Civilization and the microbe. xviii + 231 p. Houghton Mifflin Co.: Boston & New York, 1923.

6433. LE CORBEAU, A. The forest giant; the romance of a tree. Trans. by L. H. Ross. 139 p. Harper & Bros.: New York and London, 1924.

6434. NICHOLS, M. L. *Science for boys and girls.* (School Text Series.) 326 p. J. B. Lippincott Co: Philadelphia and London, 1924.

6435. PETRIE, D. *The need of a comprehensive Dominion herbarium.* New Zealand Jour. Sci. and Tech. 2: 260-262. 1919.—Herbaria in New Zealand museums are poor in extent and quality. The need for, and the functions of a properly equipped national herbarium are discussed.—*H. H. Allan.*

6436. STEVENS, O. A. *What is a weed?* Science 59: 360-361. 1924.—Objections are raised to the use of the definition "persistently obnoxious on cultivation areas" since this does not cover many plants commonly termed weeds. Weed, as commonly used, seems to refer to "a plant which is detrimental to man's interests, displeasing to the eye or of no evident value."—*C. J. Lyon.*

6437. TANSLEY, A. G. *The unification of pure botany.* Nature 113: 85-88. 1924.—The writer reviews the development of the various branches of botany, emphasizing the fact that we still know comparatively little about just how the young plant produces the characteristics of the adult form. He suggests that the study of causal ontogeny may reunite the different branches of the science.—*O. A. Stevens.*

6438. TODD, JAMES A. *Plant studies.* (Foundations of Nature Study Series.) 151 p. A. Baxendine & Sons: Edinburgh, 1924.

6439. UKERS, WILLIAM H. *All about coffee.* Roy. 8 vo. xxix + 796 p., 77 col. pl., 102 portraits, 29 maps and diagrs., 569 other illus. The Tea and Coffee Trade Journal Co.: New York, 1922.—This book aims to tell the whole story of coffee in its botanical, agricultural, commercial, historical, sociologic, literary, and artistic aspects, and includes a bibliography of 1348 titles and a copious index. Chapter I deals with the etymology of the word *coffee*, which came from the Arabic through the Turkish word *kahveh*, applied not to the plant, but to the brewed drink. The remaining chapters deal, respectively, with History of coffee propagation; Early history of coffee drinking; Introduction of coffee into western Europe (by Venetian traders, in 1615); The beginnings of coffee in France, England, Holland, Germany, Vienna; The coffee houses of Old London; Early Parisian coffee houses; Introduction of coffee into North America (in 1607, by Captain John Smith, who became acquainted with it while travelling in Turkey); History of coffee in Old New York; Coffee houses of old Philadelphia; The botany of the coffee plant; Microscopy of the coffee plant; Chemistry of the coffee bean (written by CHARLES W. TRIGG); Pharmacology of the coffee drink (by CHARLES W. TRIGG); The commercial coffees of the world; Cultivation of the coffee plant; Preparing green coffee for market; The production and consumption of coffee; How green coffees are bought and sold; Green and roasted coffee characteristics; Factory preparation of roasted coffee; wholesale merchandising of coffee; Retail merchandising of roasted coffee; A short history of coffee advertising; The coffee trade in the United States (2 chapters); Some big men and notable achievements (including the story of soluble coffee); A history of coffee in literature; Coffee in relation to the fine arts; The evolution of coffee apparatus; World's coffee manners and customs; Preparation of the universal beverage.—*C. S. Gager.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 6561, 6734, 6795, 6810, 6812, 6820)

6440. AVEL, MARCEL. *Sur l'appareil de Golgi des hématies de grenouille.* [The Golgi apparatus in blood corpuscles of the frog.] Compt. Rend. Soc. Biol. 90: 792-794. 4 fig. 1924.

6441. AVEL, MARCEL. *Sur l'appareil de Golgi du rein de la Grenouille rousse et du Triton alpestre.* [The Golgi apparatus from the kidney of *Rana fusca* and *Molge alpestris*.] Compt. Rend. Soc. Biol. 90: 794-796. 7 fig. 1924.

6442. BELLING, JOHN. *Microscopical methods used in examining chromosomes in iron-acetocarmine.* Amer. Nat. 57: 92-96. 1923.—For examining chromosomes in iron-acetocarmine, an aplanatic condenser connected with the slide by water, and used with an approximately monochromatic yellow-green light filter, gave best results if the source of light

was limited by a circular diaphragm, so that its image was about the size of the field of view, and if a reflecting prism was used instead of a plane mirror. The binocular eyepiece proved much superior to the monocular for long-continued observation. Under the special circumstances, a water-immersion objective was found to give advantages which repaid the trouble of measuring the cover-glasses; an oil-immersion lens was used only for specimens in contact with the cover-glass.—*John Belling*.

6443. BELLING, JOHN, AND A. F. BLAKESLEE. The reduction division in haploid, diploid, triploid and tetraploid daturas. *Proc. Nation. Acad. Sci.* 9: 106-111. *Illus.* 1923.—In the late prophase and metaphase of the 1st division in the pollen mother-cells; (1) there are, in the haploid datura, 12 single unconnected chromosomes; (2) in the diploid plant the chromosomes are connected in 12 pairs, forming rings or V's; (3) in the triploid datura, there are 12 sets of 3 connected chromosomes each, forming a ring with handle, a Y, a ring of 3, a bent or straight rod, or a triple arc; (4) while, in the tetraploid daturas, the 4 chromosomes of each of the 12 sets form a double ring, a quadruple arc, a ring of 4, a 4-rayed cross, a bent rod, a ring with 2 attached rods, or a triple arc with 1 rod. Occasionally single chromosomes may be unconnected.—At the 1st division, the haploid univalents do not divide; the diploid bivalents separate into 1 and 1; the triploid trivalents assort into 2 and 1; while the quadrivalents of the tetraploid are distributed as 2 and 2, or as 3 and 1. In the haploid plants the first division forms groups of $6+6$, $5+7$, $4+8$ etc. The resulting nuclei divide once, and the cells abort. In the diploid plants a division into 2 groups of 11 and 13, instead of 12 and 12, is rare. The assortment of the triploid sets of 3 chromosomes is closely conformable to the law of chance, the resulting nuclei containing numbers of chromosomes from 12 to 24, which divide again, many of the resulting microspores aborting. In the true tetraploid plants, less than 3% of the quadrivalents divide as 3 to 1, instead of as 2 to 3.—By the omission of the 1st division, pollen-grains with the somatic number of chromosomes are formed. This is commonest in the haploid plants. The volumes of the microspore-mother-cells at the reduction division are closely proportional to the number of haploid groups of chromosomes which they contain.—*John Belling*.

6444. DUESBERG, J. Longueur du fuseau et cytodierèse. [Length of the spindle and cell division.] *Compt. Rend. Soc. Biol.* 90: 627-632. 1924.—Evidence is submitted to show that the maturation spindles do not necessarily shorten at the end of mitosis, that the plane of separation of the daughter cells does not always pass through the equator of the spindle, and that the maximum volume of a daughter cell is nowise determined by the size of the spindle. The paper is followed by a discussion in which A. DALCQ took a prominent part.—*Oran Raber*.

6445. FAURE, C. L. Sur une technique de coloration rapide par l'hématoxyline au fer. [A technique of rapid staining with iron hemotoxylin.] *Compt. Rend. Soc. Biol.* 90: 87-88. 1924.—A method of staining in a few seconds is described, suited especially to material fixed in Bouin's solution or its modification by Dubosecq-Brasil.—*Oran Raber*.

6446. JOVET-LAVERGNE, PH. L'appareil de Golgi dans les schizozoïtes d'un Aggrégatidé. [The Golgi apparatus in schizozoites of *Aggregata*.] *Compt. Rend. Soc. Biol.* 90: 680-681. 11 fig. 1924.—The Golgi apparatus is described as seen in schizozoites from the cysts of *Aggregata eberthi* Labbé.—*Oran Raber*.

6447. LUDFORD, REGINALD JAMES. Nuclear activity during melanosis: with special reference to melanin formation in a melanotic sarcoma. *Jour. Roy. Microsc. Soc. London* 1924: 13-28. *Pl. 1-2, 2 fig.* 1924.—The pigment melanin is sometimes cytoplasmic in origin, in which case its origin is believed to be mitochondrial. In other cases, its origin is nuclear; sometimes it appears fully formed inside the nucleus; at other times, it is formed in the cytoplasm from material extruded from the nucleus.—*Ralph E. Cleland*.

6448. METZ, CHAS. W., AND JOSE F. NONIDEZ. Spermatogenesis in *Asilus notatus* Wied. (Diptera). *Arch. Zellf.* 17: 438-449. *Pl. 21-23, 1 fig.* 1923.—Spermatogenesis in *A. notatus* agrees in essential respects with that in *A. sericeus* described in an earlier paper (see Bot. Absts. 8, Entry 1103). A comparison of conditions in these species with those in other families of the Diptera—where the chromatin is diffuse throughout much of the growth period—suggests that *A. notatus* may represent a condition intermediate between that in *A. sericeus*

and that in many other Diptera, and that it may be possible to bring all types within a common general scheme in which synapsis occurs in the anaphase or telophase of the final spermatogonial division.—*Ralph E. Cleland.*

6449. MORGAN, T. H. One embryo from two eggs. *Sci. Monthly* 18: 354-371. 1924.—Two yolks in one shell may form 2 embryos that are not united, but they usually die before hatching time, unless one of them is so placed as to be able to use the air in the air chamber.—Occasionally, large eggs that develop large embryos are found. Fusion of 2 blastula sea urchins has been observed and has been brought about experimentally. Grafting and union of parts of amphibians and triton embryos has been carried out.—The giant eggs of sea urchins studied by Boveri (1901, 1914), Herbst (1914) and Bierus de Haan (1913) the origin of which is unknown, have twice the usual number of chromosomes. It has been suggested that the protoplasm of a germ cell fails to divide, or that two cells fuse, but such fusion does not always give giant forms. A failure to extrude the polar bodies could increase the chromosomes, but does not seem to be the cause for large eggs.—*Ascaris* eggs are said to unite and occasionally give rise to giant worms. Sala thought the unions to be due to incomplete separation of the oogonia in the last division. Strassen thinks that separate eggs united, while Kantzsch believes that the eggs fused and then gave off polar bodies.—It is thought that in some instances binucleated eggs occur in certain races of *Drosophila melanogaster*, but this has not yet been demonstrated.—*L. Pace.*

6450. MORGAN, T. H. Two embryos from one egg. *Sci. Monthly* 18: 529-538. 1924.—Isolated blastomeres of sea urchins, hydroids, a nemertean, amphioxys, a fish, a triton, and a frog gave rise to whole embryos, while isolated blastomeres of ctenophores, molluscs and ascidians gave rise to half embryos. It seems that both whole and half development proceed along lines that have already taken place in the earlier stages.—*L. Pace.*

6451. MOULIN, F. DE. Beiträge zur Kenntnis des Baues der Ganglienzelle. [Structure of ganglion cells.] *Arch. Zellf.* 17: 389-396. 1923.—The gray matter of the spinal cord, and portions of the cortex of the cerebrum and cerebellum were studied in the horse, rabbit, guinea pig, mouse, frog and lizard. Bits of tissue were mounted in a mixture of gelatin with the vitreous humour from the eye of the horse, and maintained at the body temperature of the animal from which the tissue was derived. To this methylene blue was added. This mixture, being free from electrolytes, and closely approximating the tissues under observation in osmotic pressure, surface tension and viscosity, as well as being chemically indifferent, affected the health of the nerve cells only gradually. Therefore, changes in the structure of the protoplasm accompanying death could be unhurriedly studied. In general, it was found that in health the protoplasm and nucleus of the cell were homogeneous (leaving out of consideration large structures such as pigment and fat granules, nucleoli, etc.). The nucleus contained a basophilous substance. As death approached the nuclear membrane became injured, and could no longer retain the basophilous substance, which passed out into the cytoplasm forming granules deeply stained by the methylene blue. This was accompanied by a separation of the phases within the cytoplasm, the firmer phase forming a network of threads, with the tigroid bodies. These structures are all considered to be artifacts, and not present in the living cells. Distilled water and fluids containing electrolytes brought about the same appearances, but much more quickly. Cells of the salivary glands and pancreas of the mouse are also homogeneous when healthy, showing granules only when treated as above described.—*Ralph E. Cleland.*

6452. NIHOUS, M. Remarques sur l'évolution du nucléole dans les noyaux diploïdiques de quelques Euphorbiacées et Buxacées. [Notes on the development of the nucleolus in the diploid nuclei of certain Euphorbiaceae and Buxaceae.] *Compt. Rend. Soc. Biol.* 90: 215-217. 1924.—Nucleolar changes are discussed as found in *Mercurialis perennis*, *Ricinus communis*, *Euphorbia lathyris*, and *Buxus sempervirens*.—*Oran Raber.*

6453. OEHM, GUSTAV. Studien über Riesen- und Zwergformen einheimischer Pflanzen. I. *Hedera*. [Studies of large and dwarf forms of *Hedera*.] *Beih. Bot. Centralbl.* I Abt., 40: 237-292. Pl. 6-9, 14 fig. 1924.—*Hedera helix typica*, the dwarf form *H. helix conglomerata*; and the usual garden form, *H. helix* var. *hibernica* are compared with *H. canariensis*.—The size of the epidermal cells of *conglomerata*, *typica* and *hibernica* are as 1:2:3 so that

the size of the organ parallels the size of the cells. But *canariensis*, with the largest cells, has leaves about the size of *typica*. In size of stomata, *conglomerata* and *typica*, and *hibernica* and *canariensis* are similar. The relative size of almost all the other cells increases in the order *conglomerata*, *typica*, *canariensis*, *hibernica*.—The large forms, *hibernica* and *typica*, have large cells and the double diploid or tetraploid number of chromosomes. *Conglomerata*, with small cells, has the diploid chromosome number; *hibernica*, has large cells and no increase in chromosomes.—It is possible that in *conglomerata*, in spite of the similar chromosome number, there has been a quantitative decrease of chromosomes not here demonstrable. *Canariensis*, with large leaves and small cells, possesses nuclei which resemble the tetraploid *hibernica*. The chromosome number was not accurately determined.—The results of similar investigations in other plants is compared.—*L. Pace*.

6454. SCRIBAN, I. A. Une nouvelle méthode de coloration trichome. [A new three color method of staining.] *Compt. Rend. Soc. Biol.* 90: 531-532. 1924.—A staining method is described using iron-hemotoxylin for the nuclei, lumière-green with picric acid and alcohol for the cytoplasm, and acid-fuchsin with picric acid for connective tissue.—*Oran Raber*.

6455. WEILL, ROBERT. La maturation de l'ovule d'*Halicystus octoradiatus* J. Clark. [Maturation of the egg of *H. octoradiatus*.] *Compt. Rend. Soc. Biol.* 90: 442-444. 9 fig. 1924.—The striking feature in the development of this coelenterate egg is that an equatorial spindle plate is formed when the 1st polar body is produced but not when the 2nd is formed. This shows that the presence of a plate is not related to the quantity of yolk as has been previously held.—*Oran Raber*.

6456. WINGE, Ö. On sex chromosomes, sex determination, and preponderance of females in some dioecious plants. *Compt. Rend. Trav. Lab. Carlsberg* [Copenhagen] 154: 1-26. 4 pl. 1923.—The form and pairing of chromosomes during gametogenesis was investigated in *Humulus lupulus*, *H. japonicus*, *Melandrium album*, and *Vallisneria spiralis*, with particular reference to the existence and behavior of sex chromosomes. Since in all 4 species the "male" plant is found to be heterogametic, most of the discussion and all of the figures are based on chromosome behavior during pollen development. In the 3 plants first named the pollen mother cell contains, in addition to the autosomes, a pair of chromosomes of unequal size, designated the X- and Y-chromosomes. In *Vallisneria* the pollen plant has an odd number of chromosomes in somatic cells, on one of which is an unpaired X-chromosome divided into 2 in a peculiar manner by a constriction. Thus the *Lygaeus* and *Protenor* types of sex chromosome arrangement have counterparts among plants.—The author recognizes the parallel existence of different sex tendencies in certain dioecious plants, but holds that "unisexual individuals of either sex can in their autosomes be equipped with male and probably female tendencies, but the sex chromosomes are the normal regulating mechanism which as a rule determines the sex," and that this behavior is analogous to that in *Drosophila*. The author believes that "Sex chromosomes are found altogether throughout the whole of the vegetable kingdom in dioecious species," though they may not always be demonstrable; and suggests that hermaphrodite individuals in *Humulus* arise from non-disjunction.—A marked preponderance of females is found to be the rule in the progeny of single flowers of *Cannabis sativa*, *Humulus lupulus* and *H. japonicus*; this is attributed to the greater physiological vigor of pollen grains bearing the XX chromosome combination over the XY class.—*F. Weiss*.

6457. YOUNG, R. T. Gametogenesis in Cestodes. *Arch. Zellf.* 17: 419-437. Pl. 17-20. 1923.—Evidences of degeneration of mitosis in the gametogenesis of cestodes are given. The germ cells arise from undifferentiated (possibly in some cases from de-differentiated) somatic cells. In spermatogenesis a fairly typical first maturation prophase occurs, after which the skeins break up and the 2nd spermatocytes are formed from their chromidial remains. The process of sperm development is greatly abbreviated and the structure of the sperm simplified in correlation with the rapid development of an enormous number of sperms. In oogenesis, also, maturation is started but not completed, no polar bodies being formed. This simplification may also be correlated with the development of large numbers of eggs, and the elaboration of yolk by the latter, the yolk gland showing evidence of degeneration, together with so many other organs. These observations have been corroborated by the study of a large amount of both living and fixed material from several different species.—*Author*.

ECOLOGY AND PLANT GEOGRAPHY

GEO. D. FULLER, *Editor*

See also in this issue Entries, 6346, 6379, 6419, 6502, 6504, 6510, 6515, 6516, 6517, 6524, 6532, 6533, 6617, 6638, 6640, 6642, 6644, 6645, 6647, 6648, 6652, 6653, 6671, 6672, 6674, 6738, 6763, 6784, 6785, 6790, 6797, 6815)

GENERAL, FACTORS, MEASUREMENTS

6458. ANONYMOUS. Soil sourness. *Nature* 113: 179-180. 1924.—This is a brief report on some papers given at the British Association meeting at Liverpool.—*O. A. Stevens.*

6459. ALCOCK, FREDERICK J. Across Gaspé. *Geog. Rev.* 14: 197-214. 1924.—In connection with the description of a geological reconnaissance, notes are given on the effect of different formations, chiefly volcanic rocks and serpentine, on the forest and other flora.—*S. B. Shaw.*

6460. ALLEN, W. E. Observations on surface distribution of marine diatoms of Lower California in 1921. *Proc. California Acad. Sci.* 12: 437-442. 1923.—Plankton samples were taken by the measured water method along the Pacific coast and in the Gulf of California. The catch was estimated in numbers per l. Conditions in the Gulf and in the open ocean are apparently similar. The amount of dinoflagellates was negligible. Surface catches of diatoms in Lower California and in more northern waters show great similarity although some species occur in the Gulf and not off the coast of California.—*Roxana S. Ferris.*

6461. ALLEN, W. E. Problems of floral dominance in the open sea. *Ecology* 2: 26-31. 1921.—In the open sea on newly exposed rocks the first plants to secure a foot-hold are minute thallophytes which are favored by wide dissemination of spores, rapid multiplication, small size and power of adhesion. Among land plants the conditions of dominance are; ability to endure adverse conditions, assimilative capacity which usually illustrates an interesting phylogenetic progression, reproductive capacity and freedom of attack from animals. Many of these conditions are applicable to marine plants also. Gaining a foot-hold on a certain newly exposed rock by an alga is dependent on several very slight factors. Temporary dominance may depend on the absence of spores of competent species at that particular season due to temporary changes in currents of winds, or storm currents may cause a mass of water of higher salinity to be brought to a new ocean area. Observations on such studies in dominance must be continuous. In phytoplankton, foot-hold is of little significance. Many of these forms are very sensitive to changes in salinity, light, density and temperature, and are equipped with flotation devices to keep them in their proper levels of density, etc. This might correspond to fixation devices of land plants. It is known that some forms of diatoms can live long and vigorously in pure colonies but quickly succumb in mixed cultures. The fact that the abundance of certain fish is dependent on the presence or absence of certain flagellates throws some light on this aspect of dominance. Dominance of various species has been explained on the presence or absence of some animal, on the seasonal changes of light conditions, on changes of sea bottom, on the influx of columns of colder water or on the secretion by certain diatoms of toxins detrimental to other organisms.—*H. H. M. Bowman.*

6462. CHEESEMAN, T. F. The kauri forest. *New Zealand Jour. Sci. and Tech.* 5: 166-168. 1922.—A popular account of the kauri tree [*Agathis australis*] and of the ecology of the kauri forest is given.—*H. H. Allan.*

6463. CLEMENTS, FREDERIC E. Drouth periods and climatic cycles. *Ecology* 2: 181-188. 1921.—Apparently there is a correlation between deficient rain-fall or dry periods with sun-spot maxima and wet seasons with sun-spot minima. The use of observations on the appearance of sun-spots is advocated in anticipating dry seasons. The paper includes records of precipitation and statistics on the annual growth rings of trees and observations on the unusual abundance of seedlings in dry regions. These data compared with rainfall and sunspot records show that possibly the occurrence of sun-spots may be used as a means of forecasting precipitation variations considerably in advance of meteorological prognostications.—*H. H. M. Bowman.*

6464. HARDY, F. The soil-point method for directly estimating the water supplying power of a soil in the field. Jour. Agric. Sci. 13: 355-360. 1923.—In a modification of Livingston's soil-point method of estimating the water supplying power of a soil *in situ*, ordinary lead pencils were used for an ecological field study in a sugar cane plantation in British West India. The principle of the method consists in determining the weight increase of the suitably prepared pencil after it has been in contact with the soil for a specified time. An approximate similarity was found between laboratory and field results.—*S. Lomanitz*.

6465. HILL, ROBERT R. Charting quadrats with a pantograph. Ecology 1: 270-273. 2 fig. 1920.—A description is given of a large wooden pantograph suitable for field work in ecology. A scale of 1-5 was successfully used, reducing the quadrat to convenient size. The advantages of this method of recording vegetation are speed and accuracy, with the disadvantage of a rather cumbersome instrument requiring 2 persons to operate advantageously.—*H. H. M. Bowman*.

6466. HODGETTS, WILLIAM J. A study of some of the factors controlling the periodicity of freshwater algae in nature. New Phytol. 20: 150-164. Fig. 1-3. 1921; 20: 195-227. Fig. 4-9. 1921; 21: 15-33. Fig. 10-11. 1922.—Observations extending over 3½ years, with monthly (at times fortnightly) collections, were made on the algal vegetation of a small pond near Birmingham, England. The area of the pond is approximately 300 square meters. During the summer the phanerogamic flora is abundant, occurring in well-marked zones, *Juncus conglomeratus* near the margin, next *Scirpus palustris* and *Glyceria fluitans*, 3rd *Spartanium ramosum*, and centrally *Potamogeton natans*. Meteorological data are given for the region, and also observations on the concentration of the water at various periods. Periods of low water level in general coincide with periods of high concentration, but in the autumn the decay of the leaves of *Potamogeton* brings about an increase in concentration when the water level is rising. The hardness of the water remains nearly constant, so that the variations in concentration are due to varying amounts of organic matter in solution. Definite conclusions are reached as to the periodic frequency of *Spirogyra*, *Zygnema*, *Mougeotia*, various desmids, *Oedogonium*, *Tribonema*, *Microspora*, *Vaucheria*, *Aphanochaete*, *Nitella*, various Protococcales, Volvocaceae, *Anabaena*, *Oscillatoria*, *Phormidium*, *Arthrospira*, *Cryptomonas*, and *Trachelomonas*. In each case periodicity is considered in its relation to temperature, light, and concentration of the water.—*I. F. Lewis*.

6467. KORSTIAN, CLARENCE F. Effect of a late spring frost upon forest vegetation in the Wasatch Mountains of Utah. Ecology 2: 47-52. 1 fig. 1921.—The writer gives a description of conditions before and during a severe frost which occurred the latter part of May, 1919, in the Wasatch Mountains, most of the injury being to vegetation at elevations above 5000 feet. The frost had been preceded by 4 weeks of very warm weather which caused the trees to make rapid growth and to produce succulent shoots. On May 30, five inches of snow fell, with a high humidity. In the Cottonwood nursery, 25 miles southeast of Salt Lake City, at an elevation of 7400 feet, severe damage was done to both native and exotic stock as well as to native trees on the mountains near the nursery. In the nursery itself the pines were comparatively uninjured, while the spruces and firs suffered in varying degrees. Beds which had a 3-inch covering of timothy hay were not nearly so badly injured, but coverings of canvas were not as effective. *Abies lasiocarpa*, *A. concolor*, *Picea Engelmanni*, *P. pungens*, and *Pseudotsuga taxifolia* were badly injured, *Picea excelsa*, *Pinus monticola*, and *P. contorta* suffered less and *P. ponderosa* was in all cases uninjured. Deciduous trees suffered more than conifers and were not refoliated until the end of June; all herbaceous vegetation was killed to the ground. There was but little forest forage during the entire season and what there was dried up earlier than usual.—*H. H. M. Bowman*.

6468. LEGENDRE, R. Variations de concentration des ions hydrogène des fonds marins littoraux. [Variations in concentration of H-ions in marine coastal bottoms.] Compt. Rend. Soc. Biol. 90: 183-186. 1 fig. 1924.—Attention is called (with measurements) to the variation (pH 7.75-8.40) along coastal bottoms and the necessity of further study to determine whether there is any correlation between the pH of a region and the distribution of the flora and fauna.—*Oran Raber*.

6469. LLOYD, F. E. Environmental changes and their effect upon boll-shedding in cotton (*Gossypium herbaceum*). Ann. N. Y. Acad. Sci. 29: 1-131. 1920.—Abscission results from the hydrolysis of primary and secondary cell walls, preceded and accompanied by cell division, the amount of cell division depending on age of the part and character of the structure. The position and character of the abscission "layer" is much influenced by the unstable morphological conditions characteristic of the cotton flowering branch. The abscission response period for flower buds (squares) varied from 36 hours to 10 days after injury, with a maximum fall on the 2nd day; it is usually inhibited during anthesis. The corresponding period for fruits (bolls) is 24 hours to 6 days, the period being shorter for small bolls than for large. Response is more rapid when injury is inflicted in the afternoon and, after injury by the boll weevil, varies according to the amount and character of the injury. Rain causes shedding when it falls at critical times, that is, when it destroys pollen which bursts on contact with water. Bolls doomed to shed, show inferior growth rates. Under field conditions (Alabama, 1912), maximum boll-shedding occurred on the 5th or 6th day. The response period may be longer or shorter as the season advances, according to additive or subtractive effects of various stimuli. Shedding in Alabama (excepting that due to injury) was attributable to rain and deficient soil moisture, the effect of the former being superposed on that of latter. Thus, periodic increases or waves (secondary) of shedding follow alternating periods of drought affecting superficial soil moisture. A primary or seasonal wave of shedding (on which the secondary shedding waves are superposed) appears to follow the steady depletion of water in the deeper soil. Studies of transpiration, wilting, growth, and stomatal behaviour support the view that shedding (aside from that due to mechanical injury) results from disturbed water relations. There appears to be a competition between bolls and other parts of the plant for the water supply; in brachytic varieties the competition between squares appears to be greater and results in higher square-shedding rates.—*Author*.

6470. PEARSON, G. A. Factors controlling the distribution of forest types. Part II. Ecology 1: 289-308. Fig. 9-11. 1920.—Analysis of the habitat sites is the method here employed to account for the distribution of forest types at Fort Valley Station, and the writer attempts to apply the results of habitat analysis in explaining the presence or absence of certain types from a locality. Soil analyses, air temperatures and transpiration records were taken. A consideration of all factors in this locality show that the moisture content of the soil and the air temperature are the general controlling factors. Apparently the upper altitudinal range of all species is dependant on the limitation of heat and the lower range on deficiency in moisture. Injuries from over-heating and from drought are easily confused, but certain species, as Arizona cypress, are adaptable and will grow successfully if transferred to a habitat of much higher temperature than that of their native habitat if supplied with plenty of water. Englemann spruce and Douglas fir are much more sensitive in this respect. Specific data taken on 4 forest types, viz., Pinon-Juniper, Yellow pine, Douglas fir and the Englemann spruce types, showed that the above conclusions with regard to altitudinal distribution obtained in each case. The light factor is important in the last 2 mentioned types. Seedlings of these 2 types readily winter-kill when exposed to low temperatures and need shade such as is afforded by aspens and the snow cover of their native habitats. [See also Bot. Absts. 12, Entry 213.]—*H. H. M. Bowman*.

6471. VESTAL, ARTHUR G. Phytogeography of the eastern mountain-front in Colorado. I. Physical geography and distribution of vegetation. Bot. Gaz. 68: 153-193. 17 fig. 1919.—There are 3 north-south zones—granitic foothills or low mountains, mountain-front or mountain border zones, and plains. Each zone comprises 1 or more topographic complexes. The foothills complex is analyzed in a table which correlates topographic unit-areas with vegetation-types and their variants. The mountain-border zone exhibits 3 complexes: (1) hogback ridges or cuestas and the intervening troughs, formed by differential erosion of inclined strata; (2) graded slopes covered with rock-debris, in places dissected to form terraces or "mesas," and (3) plateau area, buttes, and escarpments, mainly developed in nearly horizontal strata. The plains topography is much less varied. The vegetation of each complex is very briefly characterized.—The plains show a climatic differentiation into: plains

near mountains (18-25 miles wide), dry plains (30-60 miles), and the "rain-belt" of eastern Colorado. The mountain border is more equable in temperature and has a longer growing season than either low mountains or plains. Rainfall decreases with altitude from 22.6 inches in the higher mountains to 12.7 in the dry plains, increasing to 17 inches in the rain-belt. Precipitation is higher toward the north in all zones. An important difference in seasonal distribution is found, the highest precipitation being in April and May at the north, and in July and August at the south. Effects of this difference upon vegetation are given.—The section on local distribution of vegetation emphasizes topography as the major, and vegetation-cover as a secondary control, of immediate factors such as evaporating power of the air.—A tabular conspectus of the associations as represented in each of the 3 zones is followed by a summarized description of the 20 vegetation-types recognized.—*Author.*

VEGETATION

6472. ADAMS, CHARLES C., GEORGE P. BURNS, T. L. HANKINSON, BARRINGTON MOORE, AND NORMAN TAYLOR. *Plants and animals of Mount Marcy, New York, Part III. Ecology 1: 274-228. 2 fig. 1920.*—The contents of part III include tree distribution and growth, influence of altitude on tree growth, growth forms of plants, and summary and conclusion.—On Mount Marcy the timber line extends farther up the sides in ravines than on slopes, due possibly to the absence of avalanches in winter. Stunting of trees in alpine regions can not be accounted for entirely by drying winds and consequent loss of water from needles. In the alpine zone above timber-line trees are practically confined to depressions because of protection due to snow cover or break in the wind's force, leaders projecting above the level being killed. Destructive and prevailing winds are from west and northwest. Dead or injured twigs are not etched by frozen ice particles.—Lists of animals collected are given.—The lower limit of pure fir is 4250 feet; timber-line, is at 4890 feet; scattered tree groups occur up to 4980-5200 feet. Growth rates (chart) for balsam fir, obtained by an increment borer, show that trees grow more slowly and are shorter lived at higher altitudes, but that decay causes a higher mortality below timber-line. Raunkiaer's biological spectra show that the vegetation (66 spp.) above timber-line corresponds to that of Spitzbergen or Labrador. In the summary a résumé of the 2 preceding parts is given, i.e. the elevations, geology, mineralogy and climate of the mountain are presented. Data on evaporation rates, solar radiation, soil analyses and air and soil temperatures are discussed. The composition of the fir-forest below timber-line, the animal life of the mountain, the vegetation of Lake Tear Bog and of 2 meadows above timber-line are given. Comparisons between Peck's list of species taken in 1879 and present lists show a considerable change in the vegetation of the alpine zone. [See also Bot. Absts. 12, Entry 234.]—*H. H. M. Bowman.*

6473. CAMPBELL, DOUGLAS H. *Some botanical and environmental aspects of Hawaii. Ecology 1: 257-269. 1920.*—The geographical location, geology and topography of the Hawaiian Islands are presented, together with a discussion of their climate and rain-fall. Except in sheltered places the indigenous flora of the lowlands has been replaced by introduced plants and weeds. Conspicuous plants which have been introduced are the trees *Prosopis* and *Casuarina* throughout the islands, such shrubs as *Acacia*, *Guava*, and *Lantana*, and the herbs, *Hedychium*, *Canna*, *Clerodendron*, *Ipomoea*, and *Passiflora*, which have become naturalized in many places. On all the islands the native plants of the arable lowlands have been replaced by cultivated plants, except the strand-flora which is typical of all tropical shores of the Eastern and South Sea Islands, dominant species being *Ipomoea pes-caprae*, *Scaevola frutescens*, *Hibiscus tiliaceus*, *Pandanus* and *Calophyllum*. Where the indigenous rain-forest of the upland slopes of the volcanic mountains has not been destroyed by man for planting cane or by the promiscuous grazing of cattle and goats, the cover affords shelter for a rich flora of ferns, liverworts, mosses, lichens, and fungi. Herbaceous flowering plants are rare. Affiliations of the indigenous types of plants show them to be mostly of Old World and Australasian families. There are no gymnosperms in Hawaii and the Orchidaceae are represented by only 3 species, while the common genus, *Ficus*, is not represented by native species. The only indigenous palm is a fan-palm, *Pritchardia*, and even this is not abundant, though occurring on all the islands. The tree-ferns of the genus *Cibotium* are abundant in

all the rain forests. Endemic genera are mostly trees and shrubs. These include, *Platydesma*, *Pterotropia*, *Cheirodendron*, *Gouldia*, *Straussia*, *Raillardia*, and *Hesperomannia*. The family Lobeliaceae is most remarkable in its evolutionary development in Hawaii, especially the 2 endemic genera, *Clermontia* and *Cyanea*, as well as several species of *Lobelia*, which are tall, unbranched, palm-like trees 10 m. tall. The ecology of the various large islands in the group, viz., Oahu, Kauai, Maui and Hawaii is taken up separately. In all the islands only 6 strictly American genera are found, as compared with 50 genera common to the South Pacific. The many delicate forms with seeds and spores which could not survive a journey of 4-5 thousand miles indicate an ancient land connection with the South Pacific region.—*H. H. M. Bowman*.

6474. CHRISTY, M., AND R. H. WORTH. The ancient dwarfed oak woods of Dartmoor. Trans. Devonshire Assoc. Adv. Sci. Lit. and Art 54: 291-343. 1923.—This article gives a detailed description of 3 remarkable tracts of woodland on the open wastes of Dartmoor—Wistman's Wood, Black Tor Copse and Piles Wood. These woods are particularly noteworthy because of their limited extent (barely 4 acres), the diminutive size of the trees, and the extraordinary habitat—great piles of granite boulders with no visible soil. They are located on the steep eastern bank of the West Dart river at an elevation of 1250-1390 feet and are almost pure stands of *Quercus pedunculata*. Although dwarfed and approximately 500 years old, the trees are healthy and reproduce well. The violence of the wind has resulted in the trees becoming gnarled and stunted with twisted interlacing branches beyond all belief, while the excessive rainfall, at least 70 inches yearly, has caused the development of a luxuriant epiphytic vegetation. Careful measurements of the mean girth, mean height, leaf area and internode length supplement the historical statements and other descriptive matter.—*A. F. Hill*.

6475. HAGERUP, O. Om *Empetrum nigrum* L. En naturhistorisk Studie. [*Empetrum nigrum* L. A natural history study.] Bot. Tidsskr. 37: 253-304. 1922.—This plant is extensively found in northern Europe and in Greenland, with a southern extension to the Pyrenees. In Denmark it is found on sand in the same localities as *Calluna vulgaris*. The vegetation of the heath areas of Jutland may be divided into 6 successive stages named after the dominant plant. Beginning with the lowest they are: (1) *Oxycoccus* association (formation) with sphagnum; (2) *Myrica* association with little *Empetrum*; (3) *Erica* association with some *Empetrum*; (4) *Empetrum* association; (5) *Arctostaphylos* association with *Empetrum* in decreasing amounts; (6) *Calluna* association, a climax with *Empetrum* mostly wanting. The percentage frequencies of species in the *Calluna* association are *Calluna vulgaris* 100, *Molinia coerulea* 32, *Carex pilulifera* 32, *Genista pilosa* 28, *G. anglica* 16, *Deschampsia flexuosa* 20.—*Empetrum* regenerates slowly over a burned area, propagating vegetatively since only a few seed germinate and these slowly after having passed through the digestive tracts of animals. In the seedlings there are no bud scales the 1st year and only primary shoots possess opposite leaves. Flowers and vegetative shoots are produced in March and April after which growth is arrested to be resumed in June.—A brief English summary is appended.—*A. L. Bakke*.

6476. HARPER, ROLAND M. Geography of central Florida. Ann. Rept. Florida State Geol. Surv. 13: 71-307. Fig. 2-41. 1921.—The principal vegetation types are: (1) West coast island region with sparse coarse grass, salt marshes and mangrove swamps, sandy hammocks and scrubby thickets; (2) gulf hammock region of flatwoods with some calcicoles, and low calcareous hammocks grading into swamps; (3) middle Florida flatwoods of the palmetto type with cypress ponds, bays and non-alluvial swamps; (4) peninsular lime-sink region with high pine land and many hammocks; (5) middle Florida hammock belt which includes high pine land, red oak forests, high and low calcareous hammocks and short-leaf pine and hickory woods; (6) Hernando hammock belt with hardwood or mixed hardwood and pine forests; (7) peninsular lake region with high pine land, level flatwoods, peat prairies and sand grass marshes; (8) peninsular flatwoods with some high pine land, many cypress swamps, peat prairies and sand grass marshes; (9) peninsular flatwoods, eastern division, similar to the preceding with the addition of palmetto flatwoods; and (10) east coast region with flatwoods, old dunes with scrub passing into sandy hammocks.—To each section is added lists

of trees, shrubs, herbs, etc., and a special chapter is devoted to types of vegetation in relation to environment, including the communities mentioned above.—*J. C. Th. Uphof.*

6477. HARRIS, G. T. Ecological notes on Wistman's Wood and Black Tor Copse, Dartmoor. Trans. Devonshire Assoc. Adv. Sci. Lit. and Art. 53: 232-245. 1921.—This paper gives a description of the general appearance and ecological relations of 2 unique tracts of scrub oak woodland in Dartmoor. The 2 areas are nearly identical as regards edaphic and floristic conditions and are typical examples of xerophytic elfin-scrub woodland with *Quercus pedunculata* the dominant species. The trees are very ancient and are dwarfed, measuring only 15-20 feet in height with an average circumference of 72 inches. They grow out of piles of huge granite boulders without any visible soil, and branch profusely either at the surface of the ground or about $4\frac{1}{2}$ feet above. Both the trees and the rocks support a dense covering of vegetation, chiefly *Juncoides sylvaticum* and *Vaccinium Myrtillus* together with numerous bryophytes and lichens.—*A. F. Hill.*

6478. LLOYD, FRANCIS E., AND G. W. SCARTH. River-bank and beach vegetation of the St. Lawrence River below Montreal in relation to water-levels. Trans. Roy. Soc. Canada 16: 49-50. 1922.—Vegetational zones may be used to determine seasonal water levels and especially "high water mark." Such zones, characterized by their dominant plants, were found to have the following limits above water level (Sept. 18, 1921): (1) *Salix longifolia* zone 2.5-10.9 feet; (2) *Scirpus fluviatilis* zone 2.0-3.8 feet; (3) *Butomus umbellatus* and *Sagittaria heterophylla* zone 1.0-1.7 feet; and (4) *Vallisneria spiralis* zone 4-0.5 feet.—*G. W. Scarth.*

6479. TENGWALL, TOR ÅKE. Die Vegetation des Sarekgebietes. [The vegetation of the Sarek region.] Naturw. Untersuch. Sarekgebietes Schwedisch-Lappland 3: 269-436. Fig. 1-73, maps-2. 1920.—The Sarek region comprises a mountain range and its attendant valleys lying in northern Swedish Lapland. The range as a whole is the highest in the kingdom of Sweden. The area treated comprises 25 or 30 square miles. The lowest valley has an elevation of 500 m., the highest peak (Sarektjikko) reaches 2090 m. while the plateaus lie between 700 and 1200 m. The growing season is short, there being little vegetational activity until the middle of May and snow lying in the birch forests for a month longer than that. On the peaks winter may set in by mid-August, and snow may fall at any time. The upper limit of conifer forests lies at 500-675 m.; the chief concern of this paper is with the formations that lie above it.—Four main types of formation are treated: (1) birch forests, (2) brush lands, (3) field-coverings (*Feldschicht*), and (4) waterplant societies. The birch forests lie entirely within but comprise only about $\frac{1}{2}$ of the subalpine region, which comprises about 5% of the entire area. There are 3 sub-classes in the birch-forests formation: (a) heath-birch forest, with undergrowth of *Vaccinium*, *Empetrum*, *Bryanthus*, and sundry grasses; (b) meadow-birch forest, with *Calamagrostis*, *Deschampsia* and other grasses, *Aconitum*, *Angelica*, *Geranium*, *Solidago*, etc., shrubs (when present) mostly dwarf *Salix* spp; and (c) moor-birch forest with *Equisetum*, *Carex*, *Comarum*, *Geum*, *Caltha*, *Alnus* and dwarf *Salix*.—The brush lands are best developed on the upper borders of the birch forests whose altitudinal limits they exceed by 200-300 m. They are divided, like the birch forest, into heath, meadow and moor types. In all types the principal species are *Salix* (7 spp.) and *Betula nana*. Associated herbaceous species are largely those of the meadow-birch forest, but include also *Mulgedium*, *Valeriana*, *Anthriscus* and *Brachypodium*. In the moor-brush *Comarum*, *Petasites* and *Epilobium* are prominent. There are many mosses and liverworts throughout, and a rich growth of lichens occurs among the willows.—Most of the alpine region consists of the field-cover type (*Feldschicht*). The 5 well-marked subdivisions are: (a) tall societies of mixed herbs, (b) dwarf-shrub societies, (c) grass heaths (to which are added the some-what anomalous snow-field societies), (d) grass moors, and (e) dwarf-shrub moors.—The aquatic societies in the lakes are very briefly considered, and, finally, a quantitative analysis of the relative areas covered by the various formations is presented.—*Frank Thone.*

FLORISTICS

6480. ANONYMOUS. Endemic floras. Nature 113: 290. 1924.—This is a brief review of several papers on island floras.—*O. A. Stevens.*

6481. ADAMS, CHARLES C. Geographical distribution and origin of species. [Rev. of: WILLIS, J. C. *Age and area: A study in geographical distribution and origin of species.* $x + 259$ p. University Press: Cambridge, 1922 (see Bot. Absts. 13, Entry 2351).] Geog. Rev. 14: 339-341. 1924. [See also Bot. Absts. 12, Entry 5466, 13, Entries 761, 2347, 3402.]—S. B. Shaw.

6482. BATHGATE, A. Some changes in the fauna and flora of Otago in the last sixty years. New Zealand Jour. Sci. and Tech. 4: 273-283. 1922.—This is a popular account of changes due to the incoming of civilization.—H. H. Allan.

6483. BRAUN, E. LUCY. Composition and source of the flora of the Cincinnati region. Ecology 2: 161-180. 1 fig. 1921.—There is a map of distribution centers arranged according to Harshberger and also numerous complete lists of species occurring in the dominant communities and associations. The writer shows that the present flora of the region about Cincinnati, Ohio, is the result of the mingling of plants from several centers of dispersal chiefly from the southeast by way of the Mississippi river valley. The western centers are the next most important contributors, their plants migrating by an eastward extension of prairie formations and also artificially along rail-road beds. Seven paths of migrations, either post-glacial or recent, are distinguished. The Cincinnati region is shown to lie in a transition belt, it being the northern or northeastern limit for several southern plants and the junction area of the deciduous forests of the east and the prairies of the west.—H. H. M. Bowman.

6484. BRAUN-BLANQUET, J. Prinzipien einer Systematik der Pflanzengesellschaften auf floristischer Grundlage. [A plant-sociology classification on a floristic basis.] Jahrb. St. Gallischen Naturw. Ges. 57: 305-351. 1921.—Plant sociology is entering upon a period of great independent development, but the fundamental, conceptual side has not kept pace with the work of description, and there is still a lack of definiteness in our ideas of the units comprised. A natural system is sought, in which all plant societies can be arranged. The 1st necessary condition for such a system is a clear concept of associational units.—Plant societies are conditioned through environmental factors, past history, competition, etc.—A plant society may be approached from 2 angles; (1) phylogenetic (floristic) or (2) physiognomic-ecological. The one considers species, the other growth-forms. A parallel terminology is proposed for the 2 points of view.—Criteria of a floristic-sociological system are: (1) Social fidelity (Gesellschaftstreue), the restriction of a given species to definite associations. The development of this idea began with Heer (1835) and reached its logical culmination in the author's 5 grades of fidelity. Factors determining social fidelity are: (a) special adaptation to definite physio-chemical factors, (b) direct dependence on other plants or animals, (c) conditions of competition. The degree of social fidelity of a given species may therefore vary according to location and time. (2) Social constancy (Gesellschaftstetigkeit), the constant occurrence of a given species in a definite class of locations. Five frequency classes are proposed.—(3) Mass- and distribution-relationships of the species, comprising: (a) abundance, (b) dominance, and (c) frequency. In the past this criterion has been emphasized almost to the exclusion of others. Bases for statements of abundance and dominance are proposed.—(4) Sociability, the tendency of individuals of a given species to grow singly or in groups or masses. Five classes are proposed.—(5) The dynamic value of the species. The preceding 4 criteria consider the state of plant societies without regard to time; it is proposed to evaluate the successional values of species. This offers a point of contact between the Continental and the American-British schools of ecological thought.—(6) Accessory criteria, e.g., periodicity and duration of life phenomena, vitality or prosperity, etc.—Tabular arrangements are proposed for presentation according to social fidelity, sociological value, and successional value. A tentative arrangement of plant societies according to their sociological progression is presented, beginning with aero-plankton and ending with climax forest. [See also Bot. Absts. 12, Entry 2999].—Frank Thone.

6485. FERNALD, M. L. The Gray Herbarium expedition to Nova Scotia, 1920. Part I. Journal of the expedition. Rhodora 23: 89-111, 130-152, 153-171. Pl. 130. 1921.—Part I. opens with a summary of previous explorations of the Nova Scotian flora and the prediction

that, since such southern coastal plain plants as *Schizaea pusilla* Pursh, *Ilex glabra* (L.) Gray, *Corema Conradii* Torr. and *Lophiola* had been discovered there and since the submerged continental shelf which borders Atlantic America is highly developed off Nova Scotia, many more species of the silicious coastal plain of the south should be sought on the silicious Atlantic slope of Nova Scotia. The detailed journal recounts the gratifying confirmation of this prediction through the cooperative efforts of the author and 7 associates and their constant surprises in finding so-called Louisianian or Carolinian plants such as *Lycopodium inundatum* var. *Bigelovii* Tuckerm. (*L. adpressum* Lloyd & Underw.), *Utricularia subulata* L., *Eleocharis tuberculosa* (Michx.) R. & S. and *Solidago Elliottii* T. & G. abundantly intermingled with such Arctic or Hudsonian species as *Carex Goodenowii* Gray, *Ledum groenlandicum* Oeder, *Empetrum nigrum* L. and *Rubus Chamaemorus* L.; with the conclusion that "in a region where these comminglings of Arctic or Hudsonian with Louisianian or Carolinian species are met at every turn, one is certainly perplexed to make Merriam's zones fit the facts." Many plants which on the coastal plain of the United States are characteristic of wet peats and sands, in Nova Scotia may occur in drier, so long as highly acid, habitats: "*Schizaea pusilla* . . . in the dryish Cladonia heath or even in rock-crevices; *Woodwardia virginica* . . . or *W. areolata* . . . taking to cobble beaches," etc. "Is not this very general interchange of habitats due, to a great extent, to the unusually moist atmosphere and greatly reduced evaporation? Where there is abundant moisture everywhere the plants secure what they need, even in comparatively dry habitats." The summer's work shows "very emphatically that, whereas the distinctive flora of the highly acid but cool Atlantic slope of Nova Scotia has been derived very largely from the now submerged continental shelf and has its affinities far to the south, the distinctive flora of the warmer, inland and less acid or even calcareous regions of the province, the regions of farms and apple and peach orchards, has come from the north, northwest or west by way of New Brunswick."—*Author*.

6486. HADDON, A. C. The Pan-Pacific Congress, Australia, 1923. *Nature* 113: 28-29. 1924.—This includes a brief report on papers dealing with the relationships of the Australian flora.—O. A. Stevens.

6487. LAING, R. M. Island Bay, Wellington, a collecting ground for marine algal vegetation. *New Zealand Jour. Sci. and Tech.* 4: 204. 1921.

6488. OLIVER, W. R. B. *Logania depressa*. *New Zealand Jour. Sci. and Tech.* 4: 263-265. 2 fig. 1921.—*Logania depressa*, discovered by Colenso, has not since been observed. A photograph of the Kew Herbarium specimen and analysis of the flower is given, together with suggestions as to the best localities for search.—H. H. Allan.

FORESTRY

W. N. SPARHAWK, *Editor*

(See also in this issue Entries 6430, 6433, 6459, 6462, 6467, 6470, 6472, 6474, 6476, 6477, 6481, 6666, 6673, 6698, 6790, 6791)

6489. ANONYMOUS. *Forestry in Louisiana*. Dept. Conserv. Louisiana, Div. Forest. Bull. 7. 1-48. 1 pl., 21 fig., 1 map. 1921, reprinted 1922.—The characteristics of the 5 principal native species of pine are shown in a chart, and the map shows the forest regions of the state with the dominant trees of each. Present and past methods of lumbering, forestry, and their results are discussed. Reforestation and conservation are urged.—A. M. Taylor.

6490. ANONYMOUS. *Forests of the Gold Coast*. [Rev. of: CHIPP, T. F. *The Forest officers' handbook of the Gold Coast, Ashanti, and the Northern Territories*. 149 p. Crown Agents for the Colonies: London, 1922 (?) (see this issue, Entry 6496).] *Nature* 113: 153-154. 1924.

6491. ANONYMOUS. *Forstliches Versuchswesen in Bayern*. [Forest research in Bavaria.] *Deutsch. Forstzeitg.* 39: 331-332. 1924.—Under the revised organization of forest research

work, provision is made for investigations by administrative officers on problems closely connected with local administration, and by the Research Institute on more general or theoretical problems and those involving specialized knowledge. The research organization is also to advise and cooperate in administrative research.—*W. N. Sparhawk.*

6492. ADHIKARI, A. K. *Notes on some quick-growing species with special reference to firewood supply to tea estates in Darrang District, Assam.* Indian Forester 50: 186-188. Pl. 7. 1924.—As firewood is essential for the coolies employed on the tea estates, planting is encouraged. Best results were secured with *Albizia moluccana*, *Cassia siamea*, and *Melia Azedarach*.—*E. N. Munns.*

6493. BAILLEY, W. A. *Moribund forests in the United Provinces.* Indian Forester 50: 183-191. 1924.—The disappearance of forests from what was once good forest land has been attributed to overcutting, overgrazing, and fire. Undoubtedly all contributed, but other causes must be reckoned with, namely, shifting of stream courses followed by drying due to lowering of the water table, and flooding elsewhere, causing waterlogging of the soil. Streams and rivers in flood time may leave their courses and cut new deep channels many miles from the original bed. The degeneration of forests to scrub may also influence climate.—*E. N. Munns.*

6494. BERRY, JAMES BERTHOLD. *Northern woodlot trees.* viii + 214 p., 1 pl., 105 fig. World Book Co.: Yonkers and Chicago, 1924.—This is a popular description of the more important trees of the northeastern U. S. A., and the properties and uses of their wood.—*W. N. Sparhawk.*

6495. BRUCE, DONALD. *Preliminary yield tables for second-growth redwood.* California Agric. Exp. Sta. Bull. 3 61. 425-467. Fig. 1-5. 1923.—“Only one familiar with the yield tables for other species will appreciate the full significance of the remarkable figures for redwood presented here. One of the standard European yield tables is that of Schwappach for Norway spruce, one of the fastest growing species used by German foresters. At 60 years of age on the best site this species is assigned a basal area of 231 square feet per acre and a volume of 8,798 cubic feet. Redwood at the same age and on the best site has a basal area of 486 square feet and a volume of 20,200 cubic feet per acre. Western yellow pine on the best site in the Sierra Nevada produces, according to Gallaher, a volume of 52 m. b. m. (International rule) per acre at 60 years of age while the comparable figure from the redwood table is 139 m. b. m. One of the most rapid growing conifers in the eastern United States is the white pine, which at 50 years of age, and again on site I [the best site], yields 55 m. b. m. Redwood, it will be seen, exceeds this by 111 per cent.—On poorer sites the growth of redwood is equally remarkable. Basal area in particular, while less on the poor sites than on the good, is, as compared with that of other species, exceptionally insensitive to site conditions. . . . —The low age at which redwood reaches a size which would be considered merchantable in most forest regions is of great interest. Norway spruce, according to the Schwappach tables, has its maximum average annual volume growth at about 80 years of age on site III, and at this age the average tree is only 8.5 inches in diameter and 69 feet tall. In the case of redwood, equal diameters can be obtained at 25 years, and equal heights at 40. On site I, at the exceedingly low age of 20 years the average redwood is 8 inches d. b. h. and 50 feet high; the comparable figures for Norway spruce are 2.6 inches and 20 feet. It is unnecessary to multiply instances. Suffice it to say that the redwood has apparently the most rapid growth of all the conifers, and that it can be raised on the shortest rotation. This fact coupled with the comparative ease of reproduction and the relatively low fire risk make it perhaps our most attractive species for forest management.” —*From author's conclusion.*

6496. CHIPP, T. F. *The forest officers' handbook of the Gold Coast, Ashanti, and the Northern Territories.* vi + 149 p., 20 pl., 4 maps, 4 charts. (Published for the Government of the Gold Coast) Crown Agents for the Colonies: London [1922 ?].—This is a “first attempt at a complete presentation of the present-day position of the forests with their problems and all available information bearing on them.” The principal types of vegetation are savannah and savannah forest in the Sudanese zone, and deciduous and evergreen forests in the Guinea zone. A number of special types are also briefly described. Climatic

factors (rainfall, temperature, relative humidity) are discussed in relation to forest distribution, and it is pointed out that the main agricultural crops (cocoa, kola, and oil palms) do well only under conditions of humidity which prevail in the forest zone, and which disappear when extensive clearings are made.—The forest zone embraces 28,000 sq. miles, of which 11,400 sq. miles are considered commercial forest, deducting areas needed for cultivation and for local fuel supplies. All forests are communal or "stool" property. The outstanding factor to be considered in developing a forest policy is the gradual, steady encroachment of the Sudanese vegetation as a result of shifting cultivation and widespread annual grass fires. Forests on the main divide and its spurs must be maintained to supply timber needed in the agricultural zone. Ordinances and regulations affecting forestry are given. A list of trees and plants of economic importance, and alphabetical lists of native and botanical names are given, with plates illustrating the foliage, flowers, and fruit of 20 of the most important species. [See also this issue, Entry 6490.]—*W. N. Sparhawk.*

6497. CHOWHURI, M. C. Note on taungya plantations in the Chittagong Hill Tracts Division, Bengal. *Indian Forester* 50: 180-185. Pl. 6. 1924.—Plantations of teak, *Gmelina arborea*, *Lagerstroemia Flos-Reginae*, *Artocarpus chaplasha*, *Cedrela Toona*, *Chikrassia tabularis*, and *Albizzia* sp. have covered about 750 acres in 9 years, and over 100 acres are now planted annually. Thinnings are being made in the older stands, and sample plots have been laid out to study growth. The cost of planting ranges from 5-125 Rs. per acre. Most of the plantations are doing well.—*E. N. Munns.*

6498. COPE, JOSHUA A. Loblolly pine in Maryland. A handbook for growers and users. vii + 96 p. State Board of Forestry: Baltimore, 1923.—This bulletin treats of the characteristics and uses of *Pinus taeda*, and its growth as a timber crop. The data were secured from studies in Maryland, which is practically the northern limit of its range as a commercial timber tree. As its growth and behavior were similar in North Carolina, the data in this bulletin are probably applicable to the entire range of the species. Loblolly pine has a wider range of uses than any other tree in Maryland. These include lumber, staves and headings, mine props, piling, pulpwood, fuelwood, and lath, each of which is rather fully described, with dimensions of the various products and manufacturing costs. Growing of loblolly pine is fully described from seeding or planting to final harvest, with numerous tables and diagrams illustrating methods and results of improved forest management.—*F. W. Besley.*

6499. COPLESTON, W. E. Report of the forest administration in the Bombay Presidency including Sind for the year 1922-23. ii + 114 + 2 p. Bombay, 1924.—The report details the work of the Forest Department on the 14,992 sq. miles of State Forest. Fire protection was 96.4% successful at a cost of Rs. 3.7 per sq. mile. Early protective burning was used. Natural reproduction was fair, and artificial regeneration, particularly of teak, was generally successful. Departmental exploitation accounted for 18% of timber and 100% of sandalwood that was cut. Seven sawmills were in operation. A small amount of research in forest products is under way.—*S. B. Show.*

6500. DANA, SAMUEL T. The forests of Maine. Maine Forest Service Bull. 2. 1-28. 11 fig. 1924.—This is a discussion of the extent, character, and economic importance of the forests, which occupy approximately 15 million acres or 78% of the land surface of the state.—*W. N. Sparhawk.*

6501. DICKS, A. R. Annual progress report on forest administration in the province of Bihar and Orissa for the year 1922-23. ii + 63 + 3 p. Patna, 1923.—The report describes and tabulates in detail the work of the Forest Department. Reserved forests were increased by 3 sq. miles, while protected forests were decreased by 248 sq. miles. Fire protection was only 83.4% successful. A working plan for 419 sq. miles was approved. Reproduction of sal has been affected by drought, fires and severe frost. Reproduction of other important species was generally poor. The casuarina plantations were extended by 660 acres, and teak was also planted on small areas. Research on bamboos, tanstuffs, lac and other products indicated the possibility of profitable minor produce exploitation. Conservation of private forests is being studied. At present private operations generally result in denudation.—*S. B. Show.*

6502. DURLAND, WILLIAM D. The Quebracho region of Argentina. *Geog. Rev.* 14: 227-241. 1924.—This region in northern Argentina covers a gross area of 100 million acres, of which 45-60% is timbered. The distribution is very patchy, chiefly on slightly elevated areas. Relief is slight and in the wet season the entire country is swampy. Underground water, separated by a hardpan from the surface water, is salty under quebracho forest and fresh elsewhere. Colonization has followed the rapid establishment of extract plants which work chiefly for the foreign tanning materials market. Exploitation is crude, and the waste by inefficient cutting and by forest fires is enormous. Only the better part of the heartwood is generally saved. Logs are usually hauled on ox carts to temporary railroads. Native labor is used. About 333,000 acres yielding 3 tons of heartwood per acre are cut annually. Trees of satisfactory size can be grown in 40 years. Five classes of forest are recognized, based chiefly on exploitability. Average production of different classes of materials is given for "virgin" forest and for "good forest."—*S. B. Show.*

6503. ECKSTEIN. Die Kiefern- oder Forleule, *Noctua piniperda*. [The pine moth.] *Deutsch. Forstzeitg.* 39: 265-267; 291-294. 1924.—The moth, its life history, and the injury done by it are described and a list of natural enemies is given. Epidemics usually last 3 years and 20-50 year old stands are preferred; species other than pine (*Pinus silvestris*) are seldom attacked. Old trees are more resistant than young ones. Remedial measures include stimulation of development of parasites, banding of trees, grazing of swine, and removal of the litter. Dead and dying trees should be cut and peeled, except for a few left to trap the bark beetles which usually follow moth infestations. The most important of these beetles are *Myelophilus minor*, *M. piniperda*, *Pityogenes bidentatus*, *Ips suturalis*, and *I. acuminatus*.—*W. N. Sparhawk.*

6504. ELLIS, L. MACINTOSH. Annual report for 1923 of New Zealand State Forest Service. 29 p. Wellington, 1923.—The report details the work of the State Forest Service. Coöperative forest fire districts were formed and operated successfully. Planting covered 2,862 acres, 1,500,000 trees being distributed to private owners, and 2,500,000 trees raised by other than State nurseries. The area of State forests was increased to 7,336,000 acres, and about 2,000,000 more should be added to prevent destructive exploitation. The national inventory of forest resources and the classification and segregation of agricultural lands in the forests are proceeding rapidly. The amount of timber sold increased to 78.8 million superficial feet. Grazing is allowed, but with recognition of its danger to the forest, especially to reproduction. Deer, numbering 300,000, are a menace to forestry and to agriculture. A forest experiment station has been started and measurement of permanent sample plots begun, while ecological investigations are under way in the beech, kauri and taxad rain forests. A separate station is studying means of reclaiming the 300,000 acres of sand dunes. Much experimental work in planting, nursery, and seed collection is under way, and investigations in kiln drying and in utilization of little known species are also being carried on. The amount of lumber produced was 315 million feet, of which 45.3 million was exported, while 30.4 million was imported. Proposals for enlarging the work of the Service are included.—*S. B. Show.*

6505. FIND, J. R. Moderniserede Højdemaalere. [Modern hypsometers.] 34 p., 12 fig. Copenhagen, 1922.—The principles and application of newer hypsometers of various kinds are discussed. The Faustman hypsometer has been practically abandoned in European practice. Others, such as Forestier's, Segelcke's, the Standard Forest Service hypsometer, and the double hypsometer of H. Prytz are coming into use. Development and use of Schmal-kalder's principle is traced through various stages to the Forest Service hypsometer which gives more accurate results than Faustmann's or Christen's, while Forestier's, based upon Christen's principle, seems even more accurate than the Forest Service instrument. Prytz assumes that the heights of trees are distributed according to the probability curve, and seeks the average height of the stand rather than actual heights of individual trees. Using Christen's principle, he merely groups the trees into 3 height-classes for which the limiting heights are set off on the hypsometer. Segelcke's hypsometer, also following Christen's principle, is especially applicable for estimating merchantable contents of trees.—*W. H. Meyer.*

6506. GEBBERS. *Kommunalforstverwaltung in Preussen*. [Administration of communal forests in Prussia.] *Deutsch. Forstzeitg.* 39: 346-351; 390-393; 417-419. 1924.—State control over communal forests in Prussia takes 3 forms: (1) forests in charge of State foresters (Hanover, Hesse, Hohenzollern); (2) supervision, leaving the actual administration to the owners (Rhineland, Westphalia, East and West Prussia, Pomerania, Brandenburg, Saxony, Silesia, Posen); and (3) the State merely regulates clearing of forest land, forbids devastation, and requires restocking, leaving the management otherwise to the owners. Legislation is advocated to bring about a uniform system of State control throughout Prussia, and the essential features of a general law are discussed.—*W. N. Sparhawk*.

6507. HELPHENSTINE, R. K., JR. *Wood-using industries of North Carolina*. *North Carolina Geol. and Economic Surv. Bull.* 30. 105 p. 1923.—This bulletin discusses in detail the various kinds of wood grown in North Carolina, their distribution, and the purposes for which they are now being used with suggestions for other uses. The greatest need of the wood-using industries in North Carolina is an adequate supply of timber. A list of the commercially important forest trees of North Carolina is appended.—*C. F. Korstian*.

6508. JAHN. *Entwicklungsprobleme bei Bäumen*. *Antrittsrede zum 18 Januar, 1923*. [Development problems of trees. Inaugural address, January 18, 1923.] *Zeitschr. Forst- u. Jagdw.* 55: 193-201. 1923.—Important problems are those concerned with differences in longevity for different species, causes of senility, sexual *vs* vegetative reproduction, and the question whether a variety can be preserved indefinitely by means of artificial vegetative reproduction (grafting). Development of a nation or a civilization is analagous to that of a forest, which may survive many disasters though the individuals composing it may change.—*W. N. Sparhawk*.

6509. JAUFFRET, AIME. *Recherches sur la determination des bois exotiques colorés d'après les caractères chimiques et spectroscopiques*. [Identification of colored exotic woods by means of their chemical and spectroscopic characteristics.] *Ann. Mus. Colonial Marseille* 1920: 1-171. 1920.—Results are given of studies of 17 Indian woods, of 66 from Madagascar, 2 from Tonkin, and 4 from French Guiana. For each species, extracts were made of the powdered wood in distilled, alkaline, and acidulated water, and in 95% alcohol. Portions of the aqueous extract were treated with H_2SO_4 , $NaOH$, $FeCl_3$, and $CaOCl_2$, while portions of the alcoholic extract were treated with H_2SO_4 , NH_4OH , $FeCl_3$, and $NaHSO_3$. The effects of ether, chloroform, benzene, and carbon bisulphide in dissolving the coloring matter were also tested. The colors obtained with the various treatments were noted, based on Klincksieck and Valette's Code. Certain of the reagents produced fluorescence in many of the extracts.—The absorption spectra were studied with alcoholic solutions (pure and treated with NH_4OH and H_2SO_4) and aqueous solutions (pure and treated with $NaOH$) and also with alkaline solutions of 2 strengths.—Tinctorial properties were tested, using wool and silk yarn, treated with the following mordants: Acetates of Al, Fe, and Cr, and $SnCl_2$ combined with potassium acid tartrate. Where promising colors were obtained, their resistance to light and to washing was also tested.—The results indicate that chemical and spectroscopic properties of colored woods furnish a reliable means of identifying the species. Tables of classification of the woods studied are given, based on these characteristics. Previous work with a bearing on this study is briefly outlined, with a bibliography.—*W. N. Sparhawk*.

6510. JUNACK. *Der Fruchtfolgewald*. [Rotation of species in forest management.] *Deutsch. Forstzeitg.* 39: 341-346. 1924.—The "Dauerwald" theory is criticised as being vague and, at least for pine, impractical. In nature, rotation of species is the rule, and except on optimum sites forests seldom reproduce themselves if such a rotation is possible. Openings are usually first occupied by intolerant species which are gradually replaced by those more tolerant. Forest soils should, therefore, not be designated by the name of one species alone, but by the succession of species which naturally occupies the site, as birch-pine-oak-beech on fresh sandy soils. Cultivated forests should follow the natural course as closely as possible, except that to produce the maximum amount of high-grade timber the succession should be on a stand-wide basis rather than by individual trees. The series of crops suited to 8 classes of soil are described, with methods of handling them so as fully to utilize the site; and the probable yields are compared with those to be obtained without such rotation.—*W. N. Sparhawk*.

6511. KEESE. Die Buchen-Wollaus und ihre Gefahr. [The beech woolly aphis.] Deutsch. Forstzeitg. 39: 462-463. 1924.—Dry seasons are favorable for the spread of the aphis, while it disappears during prolonged wet periods. No serious damage to beech has been observed.—W. N. Sparhawk.

6512. KESSELL, S. L. Notes on the tannin resources of Western Australia. Western Australia Woods and Forest Dept. Bull. 3. 10 p., 1 map. 1923.—Results are given of analyses of some 20 species of eucalypts and 3 of mangroves. Of the species examined $\frac{1}{2}$ had a tannin content in some part of the tree of over 20%, and in a few cases it was as high as 50%.—C. F. Korstian.

6513. KESSELL, S. L. The hardwoods of Western Australia. 15 p., 4 fig., 1 map. Western Australia Woods and Forest Dept.: Perth, 1923.—The distribution, properties, and utilization of the principal species are described, including jarrah (*Eucalyptus marginata*), karri (*E. diversicolor*), tuart (*E. gomphocephala*), wandoo (*E. redunca* var. *elata*), salmon gum (*E. salmonophloia*), coolibah (*E. microtheca*) and sandalwood (*Santalum cygnorum*).—W. N. Sparhawk.

6514. KÖNIG. [Rev. of: WIEBECKE. Der Dauerwald, in 16 Fragen und Antworten. (The "Dauerwald," in 16 questions and answers.) 3rd ed., xix + 65 p. Pommernblatt: Stettin-Neutorney, 1924.] Deutsch. Forstzeitg. 39: 395-400. 1924.

6515. KORSTIAN, C. F. Diameter growth in box elder and blue spruce. Bot. Gaz. 71: 454-461. 3 fig. 1921.—A study of the rate and time of increase in the breast-high diameter of the trunk of *Acer negundo* and *Picea parryana* was conducted in Utah in 1920 by means of the MacDougal dendrograph. Graphs illustrate the daily changes in breast-high diameters of both species. No direct correlation between the march of diameter-growth and current temperatures was found. The growth response appeared to lag behind the temperature, a marked drop in the temperature causing a decrease in or even a cessation of growth. Growth evidently does not begin in deciduous broad-leaved trees and in evergreen conifers at the same time. The beginning and ending of the period of growth indicate the period during which peeling can be accomplished most easily.—Author.

6516. KORSTIAN, C. F. Relation of precipitation to height growth of forest tree saplings. Trans. Utah Acad. Sci. 2: 259-266. 1921.—Measurements taken in 1919 of the annual growth of 143 western yellow pines (*Pinus ponderosa*) and 111 Douglas firs (*Pseudotsuga taxifolia*) growing in the vicinity of the Grimes Pass Weather Bureau station in Idaho showed a fairly close correlation between rate of growth, as indicated by length of the internodes between the whorls of branches, and rainfall in April and May of the same year. Frost injury to Douglas fir in 1914 retarded the height growth of this species in spite of high precipitation.—Measurements of Engelmann spruce (*Picea engelmanni*) on a northern exposure in Big Cottonwood Canyon, Utah, showed that leaves grown in the dry season of 1919 averaged only 0.36 inches in length as compared with 0.71 inches for the years 1918 and 1920. The terminal twig growth was also noticeably shorter in 1919.—Author.

6517. KUGLER, FR. Lettlands Forstwirtschaft. [Forest management in Latvia.] Zeitschr. Forst.- u. Jagdw. 55: 147-153. 1923.—The Lettish forests are composed of the original Russian crown forests (400,000 hectares), nationalized forests (1,125,000 hectares), city forests (25,000 hectares), and small farm forests (about 30,000 hectares). In this article, only the first 2 classes, which are under state management, are considered. About 15% of the total area is unproductive because of fire, destructive lumbering and military activity. The system of management is very extensive, and the forest personnel is insufficient in both quality and quantity. In the crown forests, the clear-cutting system prevailed for a long time; not until just before the war was selective cutting carried on. Reproduction was secured naturally from the side or from seed trees, or artificially. Cuttings usually proceeded by strips or compartments from east to west, although cuttings from other directions often gave better results. Growing conditions are excellent, and insects and fungi are less troublesome than in Germany. Fire has been the worst enemy of the forest; in the summer of 1922, 6,000 hectares of forests were destroyed.—J. Roesser.

6518. LE BOUTEILLER, MARCEL. Exploitations forestières et scieries. [Lumbering and sawmilling.] x + 308 p., 178 fig. Dunod: Paris, 1923.—After briefly describing the structure

and composition of wood in general, and its utilization, this book covers in detail, with special reference to French conditions, the organization and technique of logging and milling, including the machinery and other equipment required.—*W. N. Sparhawk.*

6519. LEETE, F. A. *Report on forest administration in Burma for 1922-23* (1st April 1922 to 31st March 1923). *ii + 177 p.* Rangoon, 1924.—The report summarizes the work of the Forest Department, with detailed statistics. Only 3,781 out of 27,410 square miles of reserved forests are still completely unmapped. The special "Working Plans" officer has made progress in amalgamating and revising the old plans and in securing their better execution. Plans for 3,157 sq. miles were made, about half being new and the balance revisions. So-called improvement felling, removing only the valuable species such as teak without cutting inferior species, have resulted in deterioration of the mixed forests. While taungya plantations are an important means of improving the forest, the main reliance must be placed in natural regeneration, aided by skilful cutting. Planting work is badly scattered and poorly planned. The total area of plantations is 154 sq. miles. Progress has been made in studies of seasoning, and workshops have demonstrated uses for Burma species not generally used. Fire protection was given only to young plantations and to areas under regeneration, and was 95.3% successful. During the past 8 years river control works, done for the sake of teak extraction, have added 10,000 acres of arable land that was formerly swamp. The use of elephants for handling teak logs at sale depots has been abandoned.—*S. B. Show.*

6520. LEGAT, C. E. *Abridged annual report of the forest department, year ended 31st March, 1923.* [Extracted from Annual Departmental Reports (Abridged) for the period 1922-23.] Ann. Progress Rept. Forest Dept. Union South Africa 1922-23: 1-27. Pretoria, 1924.—The general features of the year's work are described. A net increase of 51,101 morgen (about 100,200 acres) was made in the area of state forest reserves. During the year, 6,210 acres were afforested, increasing the total afforested area on March 31, 1923, to 99,319 acres.—*C. F. Korstian.*

6521. LEMMEL. [Rev. of: HEMPEL, FRIEDRICH. *Die Grundlagen der Forstbetriebseinrichtung.* (Fundamentals of forest management and organization.) Vienna and Leipzig, 1922. A separate impression from Wiener Allg. Forst.- u. Jagdzeitg, April 14, April 21, and May 5, 1922.] Zeitschr. Forst.- u. Jagdw. 55: 183-185. 1923.—Hempel's work constitutes a very interesting, precise consideration of the forest political and economic situation in Austria. Its 3 chapters: the fundamental conceptions of forest management and organization; the economic foundation of forest management; and the technical foundation of forest management are briefly reviewed.—*J. Roeser.*

6522. MAMGAIN, DAYANAND. *Annual report on the forest administration in Ajmer-Merwara for the year 1922-23.* 26 p. Delhi, 1924.—The report details the work of the Forest Department. Deficient rainfall hindered forest operations and natural reproduction and it was necessary to secure fodder from the forests. Little timber can be exploited until roads are constructed. There was a small net revenue.—*S. B. Show.*

6523. MILWARD, R. C. *Annual progress report on forest administration in the Presidency of Bengal for the year 1922-23.* *ii + 47 + 3 p.* Calcutta, 1923.—The report details the work of the Forest Department. Reserved forest covers 10,709 sq. miles, or 13.6% of the province. Research dealt chiefly with natural and artificial reproduction, but insect damage to plantations of sal, teak and cryptomeria was investigated. Natural reproduction of important species was generally good, and experiments in growing 35 species were made. Taungya plantations, using several species, amounted to 1350 acres. Working plans were made for several divisions. Power logging was successfully used for the first time.—*S. B. Show.*

6524. OELKERS UND MEINE. *Trauben- und Stieleiche in der Provinz Hannover.* [*Quercus sessiliflora* and *Q. pedunculata* in the Province of Hanover.] Zeitschr. Forst.- u. Jagdw. 55: 209-218. Fig. 1-3. 1923.—The gradual sinking of the ground water level in Hanover has rendered conditions unfavorable to pedunculate oak (*Quercus pedunculata*), and sessile oak (*Q. sessiliflora*), a more desirable species, is coming into prominence. Some 600 samples from about 100 different sites were studied in order to establish certain distinguishing characters. The results of the investigation are clearly outlined and illustrated with 11 graphs

representing various taxonomic characters. A résumé of reliable distinguishing characters includes the following: Petiole $1\frac{1}{2}$ cm. and over in length indicates *Q. sessiliflora*; auriculate leaf bases indicate *Q. pedunculata*; stellate hairs were present on the under side of 88% of the sessile oak leaves, while 98% of the other species were smooth; shiny upper surface of leaf indicates almost unmistakably *Q. sessiliflora*; longitudinal striations regularly spaced around the acorn indicate *Q. pedunculata*. A special examination was made to study the inheritance of stellate pubescence and longitudinal striations. It was proven that the former becomes more absolute for *Q. sessiliflora* as the number of trees of the other species decreases in the vicinity. Also with increase in preponderance of either species within a district, the most reliable characteristic of pedunculate oak, the longitudinal striation, becomes more absolute. These facts suggest that differences between the 2 species may be due to inherited qualities rather than to site modifications.—*J. Roesser.*

6525. ORTEGEL, ROBERT. *Die Forstwirtschaft. Stand und Aufgaben im Rahmen der deutschen Volkswirtschaft.* [Forestry. Its place in the German economic system.] 77 p., 6 fig. Publ. for Reichsforstwirtschaftsrat, by J. Neumann: Neudamm, 1922.—The importance of forests and forest industries is shown, and the need for increasing forest production is emphasized. Statistics show forest areas, cut of timber and firewood, exports and imports, and domestic consumption for 1912. Approximately 1,700,000 persons are employed in wood-using industries, while about 230,000, including 4,700 technical foresters and 26,000 subordinates, are engaged in woods work on full-time basis. Wages, prices, and values of forest land are discussed in some detail. Among the problems to be solved are: (1) improvement of forest technique, including such phases as soil cultivation, artificial or natural manuring, choice of species, form of management, protection against plant and animal pests, and utilization; (2) adjustment of forest ownership, with special consideration of the large area in small private holdings now without technical supervision, and the burden of servitudes on larger holdings. Some democratic form of State supervision in which owners have a voice is regarded as essential; (3) separation of forestry and agriculture and eradication of the idea that timber production is subordinate to food production, and that use of land for timber-growing should depend upon whether or not someone wants to use it for crops or pasture. Progress in forestry depends upon research and education, now very inadequately provided for, and upon the dissemination of information and exchange of experience through various technical forestry societies and associations of owners and foresters. Official advisory councils composed of persons directly interested in forestry are recommended, while the State should do its part along the lines of legislation, promotion of research and forestry education, and, most of all, through its management of the State forests.—*W. N. Sparhawk.*

6526. RHOADES, VERNE. *Federal forest purchases and forest recreation.* North Carolina Geol. and Economic Surv. Circ. 9. 8 p. 1924.—The economic advantages of the national forests acquired under the Weeks Law are discussed, particularly with reference to their administration for recreational use. It is shown that national parks and national forests are distinct; the latter serve the practical ends of parks, while avoiding unnecessary restrictions of popular use and enjoyment.—*C. F. Korstian.*

6527. ROBINSON, R. L. *The forests and timber supply of North America.* Jour. Roy. Soc. Arts 72: 360-370. 1 fig. 1924.—The forest economic situation is summarized, and it is concluded that within a few years North America will have no timber to export. Great Britain should, therefore, promote forestry vigorously at home and should study carefully the possibility of obtaining supplies from her tropical colonies.—*W. N. Sparhawk.*

6528. SANDS, W. N. *Candle-nut and Chinese wood oil trees.* Malayan Agric. Jour. 12: 1-6. Pl. 1-2. 1924.—Notes are given on the following species, particularly with regard to their fruits and the oils extracted from them: *Aleurites triloba* Forst., *A. Fordii* Hemsl., *A. montana* Wilson, *A. cordata* R. Br., *A. trisperma* Blanco.—*R. E. Holttum.*

6529. SCHWAPPACH. *Die Saaten-Anerkennung der Holzarten.* [Certification of tree seed.] Deutsch. Forstzeitg. 39: 317-321. 1924.—In order to insure the use of tree seed which will produce plants well adapted to the localities in which they are to grow, efforts have been made for several years to restrict the sale of foreign seed, especially of pine. As there are several distinct climatic races of pine native to Germany, it is important that seed of the

locally suitable race be used in a given locality. This is especially difficult because in most districts, planted trees originating in other parts of Germany or in foreign countries, as well as those of local origin are bearing seed. König has proposed a plan by which certain stands whose origin is definitely known shall be designated for the collection of certified seed to be collected and sold under certain restrictions. Schwappach points to some of the difficulties in the way of carrying out this plan.—*W. N. Sparhawk.*

6530. SCHWAPPACH. [Rev. of: DIETRICH. *Aus den Aufnahmeergebnissen von Durchforstungsversuchen in Fichtenbeständen.* (Results of thinning experiments in spruce stands.) *Silva*. 1924: Nos. 1, 3, 4, 5, 6. 1924.] *Deutsch. Forstzeitg.* 39: 408-411. 1924.—The investigation, made by the Württemberg Forest Experiment Station, involved 5 grades of thinning (A, B, C, D, and E). Maximum yields were obtained with B thinning in young stands and C or D thinning as they became older. Thinning had little effect on height growth and its effect on diameter growth was not important. For best form of bole, light thinning is indicated for young stands, and moderate thinning as the trees become larger. From a technical standpoint annual rings should be about 2.2 mm. wide; this thickness can be attained with moderate thinning on average sites. On the best sites it is better to produce wood with rings of this width on a large number of fairly closely spaced trees than to grow an equivalent volume of wide-ringed wood on fewer widely spaced stems. The practicability of basing thinning on definite rules, e.g. determining the number of stems on the basis of average height, is doubtful; yield tables have some value in this connection, but allowance must always be made for abnormality of the individual stand.—*W. N. Sparhawk.*

6531. SEELEN, VON. *Nutzholzzucht.* [The production of timber.] *Zeitschr. Forst.-u. Jagdw.* 55: 204-209. 1923.—Wilbrand (see Bot. Absts. 12, Entry 5594), advocates thinning forest stands only after height growth has ceased, in order to obtain maximum production. He overlooks, in striving to secure long, clean boles, the other benefits from early and regular thinnings, such as retention of soil fertility and regulation of composition and increment of stand. The chief disadvantages of his method are: sacrificing strength of wood, which is important in broadleaved species, for clearness and length; loss of volume in decaying and undesirable trees; and suppression of crowns so that upon release they are unable to take advantage of the more favorable conditions, and fail to make satisfactory volume growth. This is especially true of pines, while the hardwoods respond by producing water sprouts. Furthermore, stands thinned in middle age are very susceptible to windthrow.—*J. Roesser.*

6532. SILVEIRA, ALVARO ASTOLPHO DA. *Fontes, chuvas e florestas.* [Springs, rain and the forest.] 344 p., 158 pl. Imprensa oficial do Estado de Minas Geraes (Official text of the public schools of Minas): Bello Horizonte, Brazil, 1923.—This is a popular account of the relation of forests to water supply in one of the Brazilian states. The author points out that the lack of water in springs and in streams during the dry season is due to forest devastation caused by reckless cutting and fire, principally the heavy and continuous cutting of all material suitable for posts or for fuelwood. Water, formerly abundant and flowing in regular streams, is now scarce and in times of drouth must be carried long distances by tank car to many towns. The forest is believed to have had a beneficial effect upon the climate, particularly upon air humidity and temperature.—Correction works and forest planting are necessary to control the torrents which develop during the rainy season; and the increased use of reservoirs and pumps is recommended.—*E. N. Munns.*

6533. SINCLAIR, JOSEPH H. *Notes on the mapping of an area in southern Honduras.* *Geog. Rev.* 14: 275-281. 1924.—The forests of the region are touched upon briefly.—*S. B. Shaw.*

6534. STONE, HERBERT. *Les bois utiles de la Guyane Française.* (Troisième et dernière partie). [The useful timbers of French Guiana.] *Ann. Mus. Colonial Marseille* 1920²: 1-98. 1922.—This concluding article of a series (parts 1 and 2 published in 1916-1917) describes woods belonging to the Myristicaceae, Monimiaceae, Lauraceae, Euphorbiaceae, and Urticaceae, for a large number of which the botanical identification is uncertain. There are a vocabulary of indigenous names and an 8-page bibliography.—*W. N. Sparhawk.*

6535. STONE, HERBERT A. *The study of wood.* * Indian Forester 50: 196-216. 1924.—Some woods are of best quality when slowly grown, in others the rate of growth makes no difference. The engineer demands certain qualities, some of which depend upon rate of growth (expressed in width of annual rings). The wood must have sufficient resistance to external forces, elasticity, toughness, and minor qualities such as ease of manufacture, drying, etc. Some defects are permissible, others are not. Sapwood is inferior to heart-wood and the prevalence of dry rot in buildings is perhaps due to the use of too much sapwood. Spiral grain is a defect under some conditions, but can be permitted under definite specifications. Manufacturing defects, particularly those due to improper drying, should be watched for. Strength depends upon character and position of fibers, width of rings, and absence of moisture. Water renders wood plastic and, therefore, weak. Beams showing great strength in a short test may be broken under a smaller load applied for a long time. Most tests have a 2-point suspension which is believed wrong in principle; the 1-point should give better results. Seasoning involves not only drying, but also conversion of perishable substances into compounds which resist decay and augment the resistance of wood. Wood preservatives are necessary in many cases; for wood to be used out-of-doors, creosote is best.—E. N. Munns.

6536. SWAIN, E. H. F. *Annual report of the director of forests for the year ended 31st December, 1922.* Ann. Progress Rept. Queensland Forest Service 1922: 1-30. 1923.—The general features of the year's work are described. A net addition of 411,110 acres was made, bringing the total area of reserved forest land in state forests, timber reserves and national parks to 4,536,601 acres. In reforestation activities, £4,994 were expended, or 2.86% of the net proceeds from the sale of the old crop during the same period. The gross receipts for the year amounted to £267,816, leaving a net surplus of £109,198.—C. F. Korstian.

6537. THONE, FRANK E. A. *Trees and flowers of Yellowstone National Park.* 70 p., 8 pl., 102 fig. J. D. Haynes: St. Paul, Minnesota, 1923.—This is a popular description of the more common trees, shrubs, and herbaceous plants of the Park.—W. N. Sparhawk.

6538. VISART, AMEDEV. *Quelques observations sur la culture des arbres resineux dans les differentes regions de la Belgique.* [Observations on the culture of coniferous trees in the different regions of Belgium.] Bull. Soc. Cent. Forest. Belgique 30: 174-185. 1923.—Juniper and yew are the only resinous species which have naturally remained in Belgium. According to paleontological researches, numerous resinous species, including many of those now indigenous to Japan and North America, formerly flourished in Belgium, but they seem to have been eliminated by climatic or geologic changes. The author cites those coniferous species which have been artificially introduced into this region and briefly describes the character of the products, growth, hardiness with respect to weather, and resistance to fungi and insect attacks for the following: *Pinus silvestris*, *P. pinaster*, *P. strobus*, *P. laricio*, *P. excelsa*, *P. contorta*; *Larix europaea*, *L. leptolepis*, *L. occidentalis*; *Pseudotsuga taxifolia*; *Abies pectinata*, *A. grandis*, *A. lasiocarpa*, and *A. concolor*. Douglas fir is mentioned as of the greatest probable value in Belgium. (See also following Entry.)—H. T. Gisborne.

6539. VISART, AMEDEV. *Quelques observations sur la culture des arbres resineux dans les differentes regions de la Belgique.* [Observations on the culture of resinous species in the different regions of Belgium.] Bull. Soc. Centrale Forest. Belgique 30: 231-242. 1923.—This article deals with the following species: *Picea alba*, *P. nigra*, *P. rubra*, *P. sitchensis*, *P. orientalis*, *P. Omorika*, *Tsuga canadensis*, *T. mertensiana*, *T. pattoniana*, *Sequoia gigantea*, *Thuja gigantea*, *Chamaecyparis lawsoniana*, *C. pisifera*, *C. obtusa*, *C. nootkatensis*, *Taxodium distichum*, *Cedrus Libani*, *C. atlantica*, and *C. Deodara*. A brief summary compares all of the species referred to in both this and the previous article (see preceding entry).—H. T. Gisborne.

6540. WAHL. *Noch einmal die Organisation der preussischen Staatsforstverwaltung.* [Organization of the Prussian state forest administration.] Zeitschr. Forst- u. Jagdw. 55: 141-147. 1923.—This is a reply to Lambert (see Bot. Absts. 13, Entry 2446). Wahl advocates the establishment of forest directory boards, the separation of forest administration from the general state administration and its removal from politics, and an elevation in rank and extension of authority for officers in charge of forests.—J. Roesser.

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 6428, 6448, 6449, 6450, 6453, 6455, 6456, 6457, 6524, 6587, 6589, 6597, 6598, 6605, 6643, 6693, 6708, 6813)

6541. ANONYMOUS. **A mule with a foal.** Jour. Dept. Agric. Victoria 21: 125. *1 illus.* 1923.—This is a reproduction from an American paper of a photograph showing a mule with foal.—*H. C. McPhee.*

6542. ANONYMOUS. **Pflanzenzüchtung in Schweden und Oesterreich.** [Plant breeding in Sweden and Austria.] Wiener Landw. Zeitg. 74: 61. 1924.—This is an account of the work in plant improvement carried on in the Swedish institutions at Akarp, Weibullsholm and Svalöf. It is based on observations at these stations by Erich Tschermak, and the application to similar work in Austria is discussed.—*F. Weiss.*

6543. ANONYMOUS. **Problems of race.** Nature 113: 291. 1924.—This is a synopsis of the Galton Lecture before the Eugenics Education Society on February 18, by ELLIOT SMITH.—*O. A. Stevens.*

6544. ANONYMOUS. **The large white pigs.** Genesis of the breed. Jour. Dept. Agric. Victoria 21: 60. 1923.—The origin of the Large White pig and its influence in the improvement of other breeds are briefly described. The chief qualifications of this breed are constitution, rapid growth, fine quality of meat, and large size at an early age.—*H. C. McPhee.*

6545. AHLUWALIA, GOPALJI. **The Hindu ideal of marriage.** 2nd Internat. Congress Eugenics, Vol. II, Eugenics in race and state. 264-266. Williams and Wilkins Co.: Baltimore, 1923.

6546. BAUER, JULIUS. **Chromosomale und inkretorische Hormone.** [Chromosomal and incretion hormones.] Med. Klinik 19: 427-429. 1923.—In simple organisms and in embryos chromosomal enzymes determine how cell masses shall react. In higher organisms this regulative function is partially taken over by the endocrine glands, which serve as condensers and amplifiers of the chromosomal hormones. The latter are at first, and perhaps always, elaborated in every nucleus, but with greater complexity of organization special organs develop for their more efficient production. Hereditary characteristics are dependent in part on the hormones produced in each constituent cell and in part on the same hormones produced in more concentrated form by the glands of internal secretion.—*C. H. Danforth.*

6547. BERGLUND, VICTOR. **Sechs Fälle von Hypotrichosis in einer Familie.** [Six cases of hypotrichosis in one family.] Hereditas 5: 44-48. *1 fig.* 1924.—The father of this family is the 3rd child in a family of 10 children. His brothers and sisters all had normally developed hair on the head, and normal nails, integument, and teeth. His eye-brows, mustache, and axillary and pubic hairs are normal, but he has never had hair on the head. He married twice, and has had 5 children by each of his normally-haired wives. Five of the children have been nearly baldheaded from birth, the remaining 5 present a normal amount of hair. The children's nails and teeth show no pathological changes. The abnormality is unknown either in the father's family or in the families of his wives. The children range from 2 to 25 years in age. Those without hair are 23, 18, 16, 12, and 10 years old; 3 of these are the children of 1 mother, 2 of the other. All the children seem mentally and physically normal. The absence of any unusual history of disease shows that these are unique cases of hereditary hypotrichosis.—In the father, single hairs which never project beyond the very thin epidermis, are located from 1 to several mm. apart, the cells of the hair sheaths being well formed. Occasionally the hairs are normal, though more often instead of the hair there is a sac-like lumen inside the hair sheath filled with horny layers or amorphous masses. Sweat glands are of normal size, but oil glands are much hypertrophied. Similar conditions are found in the skin from the 12-year-old daughter's head.—The man is a dominant heterozygote. His 2 wives are recessive homozygotes. The dominant baldheadedness of the father was probably due to a mutation. Sex seems to play no particular rôle in the inheritance of this trait.—The paper is a fragment of a larger manuscript on the same subject.—*H. R. Hunt.*

6548. BONNEVIE, KRISTINE. **Main results of a statistical investigation of finger prints from 24,518 individuals.** 2nd Internat. Congress Eugenics. Vol. I, Eugenics, genetics and the family. 198-211. Williams and Wilkins Co.: Baltimore, 1923.—Galton laid the foundations for investigations on the inheritance of finger print patterns. He found a decided tendency for these to be inherited. "Three types of patterns are known as whorls, loops, and arches. Whorls are characterized by 2 deltas, that is, on each side of the pattern, 1 ridge dichotomously divided forming a triradius embracing the central part of the pattern, in which the ridges may be circular, forming a single or a double spiral or even more irregular figures.—In the loops there is only one delta and 1 or more ridges form loops opening towards the side of the finger opposite that of the delta. The loops may open towards the radial or towards the ulnar side of each finger. Arches represent the simplest patterns, the ridges here running in more or less deep bows from side to side of the finger without making any backward turn or twist. There is no real delta in the arch."—Since all the fingers of each individual were studied, the total number of fingers was 245,180. Whorls appear in 25.65%, loops in 66.95%, and arches in 7.4% of the fingers. Ulnar loops occur in 61.14%, and radial loops in 5.81% of the fingers. Whorls are more numerous on right hands, while arches and loops are more frequent on left hands. All the digits have special characteristics with regard to their pattern-types. Papillary patterns on human palms and soles are rudiments of patterns on the elevated pads of early mammals. These ridges are interpreted either as "friction ridges" or as sensory structures. Digits I and IV may have retained a primitive pattern, hence they are alike. The peculiar patterns on digits II and III (high percentage of radial loops and of arches) may be regarded, not as phylogenetic vestiges but as physiological adaptations since these fingers are much used. This conclusion is confirmed when one considers the possible functions of the ridges as frictional or sensory structures, in connection with their mechanical relations with the 1st digit. Cases in which the pattern-types seem to demonstrate an hereditary influence, on statistical analysis often yield no such proof. Demonstration of hereditary effects should be based on the study of rare patterns. Whipple's theory holds that whorls are typical of elevated pads in mammals; other patterns are reduced whorls. It follows from this that ulnar loops are the typical human pattern, that conservative influences have retained the whorl (especially upon digits I and IV, and always more on the right than the left hand), and that adaptive forces, by a process of reduction, have produced arches and radial loops (digits II, III, and V). The phylogenetically oldest pattern (whorl) occurs most frequently on the right hand.—*H. R. Hunt.*

6549. BRAMBELL, F. W. ROGERS. **Sex-reversal and intersexuality.** Jour. Roy. Microsc. Soc. London 1923: 395-408. 1923.—The sex chromosome theory of sex determination is discussed in the light of known cases of sex-reversal and inter-sexuality. The sex chromosome may be an important factor in such cases, but is not absolute. Certain "factors, or combinations of factors may override the sex chromosome mechanism and turn an individual chromosomally a ♀ into a somatic ♂, or conversely. . . ." Maleness and femaleness are not essentially mutually exclusive. Every fertilized ovum contains the potentialities of both sexes, and these potentialities are retained throughout the life of each cell. In dioecious organisms, the fertilized egg may contain a greater inherent tendency toward 1 sex than toward the other, the chances of reversal being inversely proportional to the difference in strength of the 2 tendencies. Environment, on the other hand, may direct the development into 1 sex or the other, the chief environmental factors probably being in the nature of nutrition, or hormone action. Or perhaps, tendencies inherent in the fertilized egg and the environment may both work, the balance of the 2 determining the ultimate sex of the individual.—*Ralph E. Cleland.*

6550. BRUES, C. T. **The specificity of food-plants in the evolution of Phytophagus insects.** Amer. Nat. 58: 127-144. 1924.—Herbivorous insects are definitely restricted in their choice of food. From observations of many species, the adaptation of the insects, their fixity of behavior, the delicacy of their senses in recognizing plants, and the coordination of egg-laying instincts of the mother and food-appetites of their larval offspring have been noted. Walsh (1864-1865) was 1st to conclude that intraspecific groups of individuals with different food preferences existed, and he believed the preference to be hereditary. Some cases of intra-

specific differences in size in species which feed on more than 1 plant are: the apple maggot, *Rhagoletis pomonella*, which has a small form on blueberries; the leaf-beetle, *Calligrapha scalaris*, which has a large form on elm and basswood, and a small form on dogwood and plum, a race of the apple codling moth, *Cydia pomonella*, which occurs on the walnut. Some species of insects, as *Haltica bimarginata*, *Lasiocampa quercus* and *Abraxas grossulariata*, which are generally supposed to feed on only 1 plant have been known to feed on more than 1; but this may be a reversion. The probability of parallel evolution of insects and their food-plants is shown by the violet-eating Argynnid butterflies, and the Crucifer-eating Pierids. Pictet (1911) found that larvae of *Lasiocampa quercus* may be transferred from the oak to the pine, but the 2nd generation of the survivors is unable to return to the oak. Marchal (1908) reported a change in the structure of the soft scale, *Lecanium corni*, coincident with a change in food-plant. Some species of longicorn beetles (Craighead, 1921) show a preference for their particular food-plant, but may be induced to change to a closely related plant. The European geometrid moth, *Tephroclystis virgaureata*, has an early brood on Compositae—*Senecio* and *Solidago*, and a 2nd brood on *Prunus* and *Crataegus*; the adults show consistent color-differences. Göschen (1913) found that hybrid forms of the sphingid moth, *Celerio euphorbiae* × *mauretanica*, known as *wagneri*, would accept and thrive on other food-plants; but Field (1910) found in hybrid butterflies of the genus *Basilarchia* that hybridization did not always affect the selection of food-plants.—*Grace Sandhouse.*

6551. CALVERT, PHILIP P. The geographical distribution of insects and the age and area hypothesis of Dr. J. C. Willis. Amer. Nat. 57: 218-229. 1923.—The author considers the possible application of Willis' Age and Area Theory to certain insects. The Odonata or dragonflies of New Jersey make a poor showing when tested by this hypothesis. This is probably due to their great powers of flight and dispersal. The Dermaptera and Orthoptera of the Piedmont Region of the southeastern United States in the distribution of species form hollow curves approximating those of Willis. But the determination of the age of genera and species from the distribution is unsatisfactory. The Carabidae or ground beetles have quite limited powers of flight and should give better results. But here again the age of genera and species is uncertain; the geological records are very incomplete, and morphological characters alone undependable. From these examples it seems that Willis' Age and Area Theory as a key to the origin and evolution of species is with difficulty applied to insects.—*Grace Sandhouse.*

6552. CLAUSEN, R. E., AND M. C. MANN. Inheritance in *Nicotiana tabacum*. V. The occurrence of haploid plants in interspecific progenies. Proc. Nat. Acad. Sci. 10: 121-124. 1924.—Two haploid plants occurred in F_1 populations from the cross *Nicotiana tabacum* ♀ × *syvestris* ♂. Each was a replica of its immediate *tabacum* parent on a reduced scale and had the haploid chromosome number of *tabacum*. The 24 chromosomes scatter at the 1st division and divide at the 2nd. Thus far both plants have proved sterile even when pollen from the diploid *tabacum* parent was used.—*Margaret C. Mann.*

6553. COBURN, C. A. Heredity of wildness and savageness in mice. Behavior Monographs Vol. 4, No. 5, Serial No. 21. Sup. Roy. iv + 71p. Williams & Wilkins Co.: Baltimore, 1922.—The degree of wildness and savageness is judged by the behavior of the mouse on being handled. Criteria are given only for the extreme grades of each, i.e., grades 0 and 5. Twenty-three wild savage mice (grade 5 of wildness and savageness) were crossed in reciprocal matings with 21 tame non-savage mice (grade 0) and the hybrids bred without selection. The grades of F_1 , F_2 and F_3 offspring (868 mice) are compared in 37 tables. The averages are influenced by variations in age, frequency of tests and number of tests, which are found to have an effect upon the grades of wildness and savageness in the hybrids. The author concludes that "it seems fairly clear that the inheritance of savageness and wildness in mice is Mendelian of the blending or multiple factor type," since " F_1 's vary around the intermediate grade 3 with some individuals possessing a grade of wildness and savageness or tameness and non-savageness equal to that of the parental generation," and in that "the degree of wildness and savageness of the F_2 's varies about the same intermediate grade and that this variability is also in accordance with the Mendelian expectation in being greater than that of the F_1 's." F_2 grades lower than F_1 , F_2 almost as high as F_1 . Females tend to grade higher

than males.—In the “general summary of individual inheritances” the hybrid generations are separated into the following 4 classes, given in the order of the observed frequency: wild savage (most frequent), wild non-savage, tame savage, and tame non-savage. “Savageness is more usually associated with wildness than with tameness.” The number of wild and savage females in each generation is greater than that of the males.—Experiments in selective breeding show that “if both parents were wild, (the average of their 3rd, 4th and 5th tests for wildness being equal to or exceeding 2.5 grade), in the majority of cases it would be found that the number of wild offspring was greater than that of tame, or if the parents were tame the greater number of offspring would be tame.” The conviction of the writer is confirmed “that much more work is needed in this field before the precise manner of the inheritance of wildness and savageness in mice can be definitely stated.”—*E. M. Lord.*

6554. CORRENS, CARL. *Etwas über Gregor Mendel's Leben und Wirken.* [Gregor Mendel's life and work.] *Naturwissenschaften* 10: 623–631. 1922.—This paper in 6 sections, begins with a brief history of the 3 chief epochs of plant hybridization as illustrated by (1) the work of Kolreuter, and Gärtner; (2) the significance of hybrids for the species problem as exemplified in the work of Knight, Herbert, Jordan, Godron, Naudin and E. Regel, and (3) the study of hybrids from the standpoint of the method of transmission of characters from generation to generation as shown in the work of Darwin, Nägeli, Weismann, O. Hertwig, de Vries and Mendel. Section I is followed by (II, III) a brief biography of Mendel and a résumé of his work.—IV. *Mendel's predecessors.* Various hybridists had worked with peas before Mendel, especially Knight, J. Goss, and Gärtner, but had noted only part of the facts found by Mendel, who, moreover, was the first fully to interpret the facts. Naudin was the only contemporary who approximated this interpretation; his contribution appearing in 1863 after Mendel had been working for years and had reached his conclusion. According to Naudin, the hybrid is a mosaic in which tendency to separation increases with age so that the highest degree is reached in pollen and ovules, some of which correspond entirely to those of the father, some to the mother, while in some separation is incomplete or not begun. Thus he differed from Mendel in conceiving a “specific essence” which represented the whole genotype of the parent, and he failed to explain the occurrence of new homozygous combinations and the clean cut segregation, which Mendel's theory made clear.—V. *The fate of Mendel's chief work.* The Natural History Society of Brünn exchanged proceedings with 120 similar societies. The clarity and conciseness of Mendel's paper are well known, but it was opposed to current ideas so a repeated detailed presentation would not have been superfluous. Several scholars knew of his papers but failed in appreciation of their significance. That Nägeli's failure was mainly due to the very newness of the idea is clear, and when 20 years later he published his own great work he explained heredity by representatives of individual characters but forgot to acknowledge his indebtedness to Mendel. He may have seen in Mendel something of a dilettante which, from his standpoint, was not entirely wrong, as he found a morphological error in the classical 1st contribution; but this to us does not minimize the significance of the work.—VI. *Later discovery of the Mendelian laws.* In 1893 W. Haacke, a zoologist, reported alternative inheritance of dancing versus non-dancing and pied versus white color in the mouse, and, without knowledge of Mendel, explained it as due to a separation of different “Plasmen” into different germ cells of the hybrid; while color inheritance was due to 2 nuclear materials which were segregated independently of the Plasmen. He assumed a typically Mendelian gametic series with resultant new combinations in F_2 . But his scheme would not work for 3 independent pairs of characters. Early in 1900 there appeared from the pens of 3 botanists (de Vries, Correns, and Tschermak) works which brought to light the forgotten observations of Mendel. On consulting the literature they each found Focke's brief comment (*Pflanzenmischlinge*, 1881) on Mendel's work. Thus, in 1900, came Mendel's time, as he claimed it would. General recognition followed freely, but not quickly and not without friction. Mendel, in his “Versuche über Pflanzen-Hybriden,” placed in our hands an instrument comparable in importance to the lever of Archimedes. Unfortunately he could not attack the problem which embittered the last 12 years of his life with the dispassionate calm of the great Greek investigator.—*E. B. Babcock.*

6555. DETLEFSEN, J. A. **Are the effects of long-continued rotation in rats inherited?** Proc. Amer. Phil. Soc. 62: 292-300. 1923.—A report on the work started by Bentley and Griffith together with some original results by the author on the effects of long continued rotation in rats is given. Griffith maintains that individuals with a long history of rotation in their ascendants have descendants which show a high incidence of specifically disequilibrated individuals. The frequent pathological disturbances and high mortality rate among such individuals suggests, however, that long continued rotation may produce a condition known as labyrinthitis which might be passed on to the offspring. The occurrence of labyrinthitis among unrotated stocks suggests such a possibility. Twenty of such cases have been tested by the author for equilibratory response and the rotations have been found to correspond, both quantitatively and qualitatively, to Griffith's disequilibrated individuals. This indicates that probably Griffith has induced numerous cases of labyrinthitis among his rotated rats. The writer has practiced constant intermittent rotation with the result that there is a gradual diminution or total loss of nystagmic response. When individuals are removed from the apparatus the effects persist for a long time. It is not yet known whether the unrotated offspring will also show a modified response.—*H. C. McPhee.*

6556. DREGER, A. **Gesammelte Erfahrungen eines Pflanzenzüchters.** [Collected experiences of a plant breeder.] Zeitschr. Pflanzenzücht. 9: 101-136. 3 pl. 1923.—Advice is given on equipment, methods, records, etc., from the proprietor of the seed-breeding firm of Chlumeck & Cie., which specializes in sugar beets, red clover, rye, and wheat.—*Edgar Anderson.*

6557. EMERSON, R. A. **A genetic view of sex expression in the flowering plants.** Science 59: 176-182. 1924.—Sex characters of the flowering plants are to be interpreted on the basis of genetic factors associated with chromosomes, just as are vegetative characters. Factors influencing the development of ♂ and ♀ organs in the monoecious species, *Zea mays*, have been shown to behave quite as do other genes. In typically hermaphroditic forms, factors for maleness and for femaleness are considered to be in so delicate a balance that influences analogous to those responsible for the differentiation of vegetative characters effect a more or less regular differentiation of sex organs. Also, in prevailing dioecious forms of the flowering plants, factors for maleness and for femaleness presumably are present both in male and in female individuals, but here the balance is more strongly to the one or the other condition. The approximate numerical equality of individuals of the 2 sexes in these forms at once suggests a chromosome mechanism similar to that known to exist in numerous animal groups. Sex linkage in a dioecious species of *Lychnis* favors this assumption. Morphologically unlike sex chromosomes have not been found in many plants. Sex factors need not necessarily influence the size or form of chromosomes more than do other genes. Chromosome differences in many dioecious animals may be due to the opportunity for the indefinite accumulation of recessive zygotic lethals afforded by the enforced heterozygosity of 1 sex. Occasional self-fertilization of prevaillingly dioecious individuals among flowering plants may tend to prevent the accumulation of recessive lethals in the heterozygous sex. The occasional appearance of sex intergrades approaching the condition of typical hermaphrodites may be due to the influence of several heterozygous sex factors of relatively minor influence. Occasional self-fertilized seed from otherwise ♀ or ♂ plants should give progeny all of 1 sex in 1 case and of both sexes in the other. Experimental results are not conclusive on this point.—*D. F. Jones.*

6558. FISCHER, WALTHER. **Variabilitätsstudien beim Wiesenschwingel.** [Variability studies on meadow grass.] Jour. Landw. 71: 121-180. 1924.—The significance of individual characters was tested for breeding purposes upon the basis of their variability. Testing has resulted in: (a) establishing the variability of varieties as to their individual characteristics, (b) establishing the trueness of the characters, (c) establishing the growth relation of the characters. The greatest variations were in leaves, yield, grain portion and coarseness of straw. Preliminary investigations show that the leaf portion runs less true than the other characters. No correlation was found to exist between the average length of straw and relative number of straws; no correlation exists between size of straw and relative number of straws. A correlation was found to exist between size of straw and average straw length.—*F. M. Schertz.*

6559. GATENBY, J. BRONTÉ. Further evidence on the transition of peritoneal cells into germ cells in *Amphibia*. Jour. Roy. Microsc. Soc. London 1923: 409-416. Pl. 16-17. 1923.—Evidence is presented to show that in adult females of *Rana temporaria*, cells of the peritoneal epithelium of the ovary may become metamorphosed into oocytes. A discussion of the results follows.—Ralph E. Cleland.

6560. HOLMES, SAMUEL J. A bibliography of eugenics. Univ. California Publ. Zool. 25: 1-514. 1924.—This work comprises about 9000 references to articles, books, memoirs, etc., dealing more or less directly with problems in eugenics, but the author does not claim to have made a complete list. The references are grouped in sections according to subject matter. Critical comments by the compiler precede most of the sections. Some of the subjects covered are: heredity and evolution, genealogy, degeneracy, notorious families, inheritance of human traits and defects, alcoholism, venereal diseases, lead poisoning, delinquency, prostitution, pauperism, inheritance of mental ability, race, the birth rate, natural selection in man, selection in war, sexual selection in man, urban selection and the influence of industrial development on racial heredity, the racial influence of religion, immigration and emigration, race mixtures, sex determination, sterilization, segregation, etc.—H. R. Hunt.

6561. HUETTNER, A. F. The origin of the germ cells in *Drosophila melanogaster*. Jour. Morph. 37: 385-423. 2 pl., 2 fig. 1923.—This is a cytological investigation of the origin of the primordial germ cells in the developing egg of *Drosophila melanogaster*. These cells are derived from the "polar cells" in the egg. The number of these nuclei is variable, and any egg nucleus which comes into this region of specialized ooplasm may become a germinal nucleus. The bearing of these observations on the germ cells of gynandromorphs is discussed.—H. H. Plough.

6562. JENNINGS, H. S. The numerical relations in the crossing over of the genes, with a critical examination of the theory that the genes are arranged in a linear series. Genetics 8: 393-457. 1 fig. 1923.—The author analyzes the conditions required by the linear theory and compares the theoretical expectations with the accumulated experimental data on crossing over in *Drosophila melanogaster*. An examination of the best known crossover ratios of Chromosome I of *Drosophila* reveals many general relations in the experimental results. These have been formulated into 17 basic propositions with which any adequate theory should agree. From the requirements of the linear theory, formulas are developed for crossover ratios when there is no interference. By using these formulas a series of crossover ratios are developed and compared with the experimental results. Three numerical discrepancies are found: (1) the observed ratios for distant genes are greater than is possible on the linear theory without interference; (2) there is an excess in the proportion of chromosomes showing only 1 break; (3) the "map distances" of Morgan are much less than required by the linear theory without interference. Hence the linear theory without interference cannot account for all of the observed ratios. By a similar comparison of the crossover ratios required by the linear theory with interference it was found that (1) when interference extends over a distance of less than 30 units the crossover percentage is less than 50 and (2) when interference extends over a distance greater than 30 units, and as the distance between the genes becomes greater, the crossover percentage rises above 50. As the distance between the genes is still further increased the crossover ratio decreases and falls below 50%. Hence, for interference extending over long distances the correct serial order of the genes would not be given by the crossover ratio measured from the end gene. But where interference extends over a distance of 20 to 25 units the theory of the linear order of the genes satisfactorily accounts for the exact numerical relations found in experimental data.—H. C. McPhee.

6563. KAJANUS, B. Über eine Kreuzung zwischen grünblättrigem und gelbblättrigem Tabak.] A cross between a green-leaved and a yellow-leaved tobacco.] Hereditas 5: 84-86. 1924.—The author reports success in combining the early blooming, maturing, and growth habit characters of "Brasil" with the yellow leaf character of "white Burley" tobacco. Green is dominant. In F_2 , 5037 plants were green, and 229 yellow; but since classification was often difficult, he believes that this represents a 15:1 condition, due to the fact that 2 genes either alone or together produce the green type; their absence produces the yellow. The results in F_3 tend to bear out this assumption.—Margaret C. Mann.

6564. KAJANUS, B. *Zur Genetik der Pisum-Samen.* [The genetics of *Pisum* seeds.] *Hereditas* 5: 14-16. 1924.—The mutation recently reported by Tedin is shown to be identical with one previously described by the author. Genetical formulas are given for the 2 cases. A report is also made of a consultation with Tschermak concerning his use of the term "violett" in describing the hilum ["eye"]. Since the latter appears black to the unaided eye it is decided so to designate it.—*Edgar Anderson.*

6565. KEARNEY, THOMAS H., AND GEORGE J. HARRISON. *Selective fertilization in cotton.* *Jour. Agric. Res.* 27: 329-340. 1924.—Egyptian cotton and upland cotton represent 2 very distinct but perfectly inter-fertile species of *Gossypium*. It was found that when pollen of both species is presented simultaneously and in approximately equal quantities to the stigmas of either, nearly 75% of the ovules are self-fertilized. The evidence indicates that this occurrence of selective fertilization in favor of the like pollen is not attributable to differences in the compatibility or viability of the 2 kinds of pollen, nor to selective survival, at any stage, of the zygotes resulting from fertilization by the like pollen. No evidence of a differential rate of pollen tube development was obtained. As an explanation of this case of selective fertilization, it is suggested that presence of the like pollen induces a physiological reaction in the stigmatic or stylar tissues which makes them an unfavorable medium for the unlike pollen grains. The further assumption is made that some of the latter are able to overcome or avoid this obstacle to their development.—*T. H. Kearney.*

6566. KELLOGG, VERNON L. *Mind and heredity.* v + 108 p. Princeton Univ. Press: Princeton, 1923.—This book is a consideration of the various types of minds from the stereotyped, instinctive mind of the ♀ wasp of *Ammophila* to the intelligent, rational mind of human beings. The treatment is comparative, evolutionary, and in language intelligible to the educated layman. Numerous illustrations are given of these mind types in action. The work of Galton and Mendel is briefly explained in its relation to the inheritance of mental ability. The "equality of man" and intelligence tests are discussed, as is also the relative place of heredity and environment in the human mental make-up. "In climbing down this genealogical tree, we do not get very far before we are looking ancestors in the face whose minds were determined for them practically exclusively by heredity. Is it surprising then that along with the determination of much of our bodily character and capacity by unquestioned biological inheritance, we should find our mind, a function chiefly of our central nervous system, also partly, even largely, determined in its character and capacity by heredity. The wonder is, rather, that we should find our minds as responsive as they are to modification by environmental (which of course includes educational) influence."—Some of the chapter headings are: The instinct mind of *Ammophila*; reflexes of honey-bees and silk-worm moths; intelligence and reason; the inheritance of mind; education and the mind; intelligence tests; society organization and mental capacity; racial traits and immigration; heredity and environment in mind determination.—*Orland E. White.*

6567. KRÖMEKE, FRANZ. *Zur Frage der hereditäten hämorrhagischen Diathese.* [Inheritable hemorrhagic diathesis.] *Deutsch. Med. Wochenschr.* 48: 1102-1105. 1922.—A condition akin to purpura, producing a kind of morbus maculosa, or leopard skin, as a result of subcutaneous extravasation of blood, and also characterized by extensive hemorrhages and slow clotting time, occurs in 3 generations, a woman, her 3 daughters, and the son and daughter of 1 one of the latter. One man in the 2nd generation and several individuals of both sexes in the 3rd are normal. In these cases the spleen and liver are always normal but there is some disturbance in the relative numbers of blood elements, especially of the platelets, which in all cases show a marked diminution.—*C. H. Danforth.*

6568. LAUGHLIN, H. H. *Eugenical sterilization in the United States.* xxiii + 502 p. Psychopathic Laboratory of the Municipal Court of Chicago: Chicago, 1922.—The purpose of eugenical sterilization is to prevent procreation by persons whose pedigrees demonstrate them to be potential parents of defective children.—Fifteen states have enacted 23 laws (1907-1921) authorizing sexual sterilization. Laws on this subject, at the time of the compilation of the book, were in force in 9 states. These enactments should be regarded as preliminary legal experiments in this field of legislation. The motives have been eugenical, punitive, or therapeutic. The purposes and fates of these laws are enumerated.—The types

of operations which destroy a man's power to procreate and the sterilization operations for women are detailed. Vasectomy or salpingectomy in adults with healthy sex organs induce practically no mental, structural, or physiological changes, other than to render the person sexually sterile.—The chief legal obstacles to eugenical sterilization laws have arisen from the facts that they were applicable only to the inmates of institutions (class legislation), or were in some cases punitive. A model law is presented with the following features: (1) all persons (normal or otherwise, in or out of custodial institutions) whose pedigrees show them to be "potential parents of socially inadequate offspring," shall be sterilized; (2) there shall be a State Eugenicist, with a corps of assistants, who shall investigate the pedigrees of socially inadequate persons, or the potential parents of such; (3) the cases of such persons shall be heard in court; (4) the State Eugenicist may then, upon order of the court, proceed to secure a competent surgeon who shall sterilize such persons.—*H. R. Hunt.*

6569. MANN, MARGARET C. A demonstration of the stability of the genes of an inbred stock of *Drosophila melanogaster* under experimental conditions. *Jour. Exp. Zool.* 38: 213-244. 1923.—An attempt to produce mutations in a stock of *Drosophila melanogaster* was made by treating the flies with As, C_2H_5OH , quinine, morphine, $CuSO_4$, and a number of other drugs and chemicals. Neither these substances nor extremes of temperature caused any increase in the number of mutations observed as compared with controls, although non-heritable effects on brood size and sex ratio appeared. "These experiments add further evidence to the great bulk already existing, which indicates that induction of heritable variations is by no means an easy task," and make it increasingly desirable that cases of apparent induction be repeated.—*H. H. Plough.*

6570. MASSART, J. Les quatre étapes de la conjugaison sexuelle. [The four stages in sexual conjugation.] *Bull. Acad. Roy. Belg. Cl. Sci.* V, 7: 38-53. 1921.—Conjugation involves 4 successive stages: (1) Approximation of cells; (2) union of cytoplasm; (3) union of nuclei; (4) union of chromosomes. These stages are, in various phyla, separated in different ways and to different degrees by interposed nuclear and cell divisions. The author discusses the position of the 4 stages in question in the life histories of *Coleochaete*, the Schizogregarines, Conjugatae, Bryophytes, Pteridophytes, Phanerogams, Uredineae, Infusoria, Heliozoa, Diatoms, Eugregarines, *Ascaris*, Echinids, *Crepidula*, and *Fucus*.—*C. E. Allen.*

6571. MOLZ, E. External factors affecting the sex ratio in beet nematodes. *Zentbl. Agric. Chem.* 50: 258-262. 1921. (Abst. in *Exp. Sta. Record* 48: 245-246. 1923.)

6572. NILSSON-LEISSNER, GUNNAR. Über eine aberrante form von Wintererbsen (*Pisum sativum*). [An aberrant form of winter pea.] *Hereditas* 5: 87-92. 5 pl. 1924.—Twelve abnormal plants appeared in a population of *Pisum sativum* followed the next year by 2 more from the same strain. They were fully sterile as females but bore apparently good pollen and were crossed with *P. sativum* and *P. arvense*. The crosses have been carried through 2 generations but all the progeny are normal. The new form is described as *P. aphacoides*. It differs from *P. arvense* in being lighter green and having all parts generally smaller, narrower, and more pointed. The epidermal cells are proportionately longer. The flowers are strikingly different; the ovaries, abnormal. After considering several explanations the author favors the view that the form is pathological. References are given to reports of similar forms in other leguminous plants.—*Edgar Anderson.*

6573. PHILLIPS, J. McI., AND W. M. BARROWS. Heredity of angioneurotic edema based on a review of the literature. *Genetics* 7: 573-582. 5 fig. 1922.—Clinically there is considerable variation in the manifestations. Genetically the condition is sporadic or familial. A sporadic case often appears in families, members of which suffer from hayfever, asthma and related afflictions. Several family history charts suggest that familial angioneurotic edema behaves as a simple dominant trait, but the tabulated results of 145 matings are not entirely consistent with this conclusion. Alternative possibilities are mentioned.—*C. H. Danforth.*

6574. PLOUGH, HAROLD H. Radium radiations and crossing over. *Amer. Nat.* 58: 85-87. 1924.—Female *Drosophila melanogaster* heterozygous for 2nd chromosome characters were exposed to the beta and gamma radium radiations for varying intervals. A small number of tests of the percentage of crossing over shown by the offspring of these flies make it appear

that short exposures decrease while longer exposures increase the amount of crossing over. Since gamma radiations are X-rays, the results are compared with those recently announced by Mavor.—*H. H. Plough.*

6575. TALIAFERRO, W. H. A study of size and variability throughout the course of "pure-line" infections with *Trypanosoma Lewisi*. Jour. Exp. Zool. 37: 127-168. 10 fig. 1923.—Study of the course of an infection with *Trypanosoma Lewisi* in the rat shows it to be divided into (1) a multiplicative stage, (2) an incubation period in the blood, (3) a multiplicative period in the blood, and (4) an "adult" stage in the blood. A study of the coefficients of variation for size was made in the last 2 stages, and shows marked changes during (3), and an extremely constant and low set of values during (4). In the last stage, then, it is possible to study the effect of growing a "pure line" under different environmental conditions (i.e., in different rats) uncomplicated by growth factors which have entered into all previous investigations in protozoa. This study is now being carried forward.—*H. H. Plough.*

6576. THOMAS, ERWIN. Zur Frage der erworbenen und ererbten Tuberculoseimmunität. [Acquired and inherited immunity from tuberculosis.] Deutsch. Med. Wochenschr. 48: 895-896. 1922.—The 1st attack of tuberculosis gives some immunity, but often not enough to prevent a 2nd attack. There is evidence that many individuals are more or less immune from birth but it is not clear whether this inborn immunity is something acquired *in utero* or something inherited through the germ cells. A study of the offspring of mothers who have had tubercular infection and those who have not is greatly needed. "Individual pathology" should be emphasized more than in the past.—*C. H. Danforth.*

6577. WRIGHT, SEWALL, AND ORSON N. EATON. Factors which determine otocephaly in guinea pigs. Jour. Agric. Res. 26: 161-182. 1 pl., 3 fig. 1923.—Among 40,000 guinea pigs raised at the Bureau of Animal Industry, 82 monsters of the otocephalic type have been produced, forming a series of increasing defectiveness. Of these, 50 have been produced by a single family. The belief that inbreeding leads to the appearance of such monsters is disproved by the fact that in 14 inbred families comprising a total of 12,037 young, not a single otocephalus appeared. The fact that family 13, which produced the highest percentage of otocephali, also produced the heaviest pigs and largest litters shows that the appearance of otocephali is not a manifestation of lack of vigor. A line which had been producing about 1% suddenly jumped to 4% in 1 of its lines, and this gave rise to a subline in the 19th generation which produced over 20%. Females of family 13 do not produce as many otocephali in outcrosses as they do in mating with their brothers. The females are twice as likely to be affected as the males. The authors suggest the possibility of there being a lower level of metabolism in the ♀ than in the ♂ embryo at the critical moment of development thus rendering it more susceptible to unfavorable conditions. An otocephalus is as likely to be born in 1 litter as in another and a litter mate of an otocephalus is not appreciably more likely to suffer the defect than a nonlitter mate. The authors conclude that the most important factor determining the occurrence of otocephaly is probably chance delay or other irregularity in implantation acting on a genetic basis at a particular moment of the development of the individual.—*H. C. McPhee.*

HORTICULTURE

J. H. GOURLEY, *Editor*

JOHN BUSHNELL, *Assistant Editor*

(See also in this issue Entries 6369, 6380, 6426, 6439, 6730, 6744, 6745, 6746, 6752, 6766, 6797)

FRUITS AND GENERAL HORTICULTURE

6578. ANTHONY, R. D., AND J. H. WARING. The apple industry of Pennsylvania. Bull. Pennsylvania Dept. Agric. 56: 1-205. 1922.—This gives the results of an orchard survey conducted by the State College and the State Department of Agriculture. The report includes the following features: history of the apple industry, and characteristics of apple culture in the different regions of the state; number of surveys and acres; relation of acres in orchard to size

of farm and type of business; crop rotations on fruit farms; percentage of total income derived from fruit; work animals per farm with and without tractors; dairy and beef cattle, and hogs on the fruit farm; number of acres for each hired man; apple varieties; soils of the fruit regions; cultural methods; planting; shaping and pruning the trees; insects and diseases; frost damage; spraying and dusting equipment; sod and cultivated orchards; fertilizers; cover crops; thinning; size of picking and packing crew; grading and packing the crop; hauling the crop to market; marketing in the different regions of the state; carlot shipments; period of marketing; fruit stage; and cost of growing apples. An appendix contains data on production of apples by counties in 1919, records of carlot shipments for 1916-1920, commercial cold-storage houses, and a list of by-products plants.—*C. R. Orton*.

6579. BARNETT, R. J. **Pruning fruit plants.** Kansas Agric. Exp. Sta. Circ. 102. 1-24. 12 fig. 1924.—Pruning young and old fruit trees for proper growth and fruitfulness is described. Bush fruits and grapes are mentioned.—*L. E. Melchers*.

6580. GEORGI, C. D. V. **Illipe nuts and Borneo tallow.** Malayan Agric. Jour. 12: 77-85. 1924.—The illipe nuts of Malaysia are mainly the fruit of species of *Shorea*, not of *Bassia*, which yields the true illipe nut of India. The nuts are collected by natives from the jungle, and there is no cultivation of the trees, the botanical identity of which is uncertain. A report is made as to the properties of fats extracted from 7 commercial classes of nuts, and from seeds of *Shorea Thiseltoni*.—*R. E. Holttum*.

6581. JAFFA, M. E., AND H. GOSS. **Avocado culture in California. Part II. Composition and food value.** California Agric. Exp. Sta. Bull. 365. 630-638. 1923.—The average total dry matter in the edible portion of the avocado, based on examination of mature California fruits, is 29.44%. The nearest approach to this figure is found in the banana with about 25% dry matter. Sugar and starch predominate in the banana as against fat in the avocado. The minimum figure for protein in the avocado is 1.14, which is about 75% of the maximum. The maximum, 4.39%, credited to Bartley avocado grown at Santa Ana, corresponds to the protein content of some dried fruits. So far as protein in fresh fruits is concerned, the avocado stands in the lead. The carbohydrate content of the avocado is low as compared with this constituent in fresh fruits. The average for the 83 mature varieties is 5.95%, with a maximum of 10% and a minimum of 2.59%. The percentage of mineral matter in the avocado is much higher than that recorded for any other fresh fruit. The minimum of 0.54%, reported for the Rhoad variety, equals approximately the average for most of our fresh fruits, while the average for the avocado, 1.32%, shows that it contains twice as much mineral matter as that yielded by any other fruit. So far as protein and ash in fresh fruits are concerned, the avocado stands at the head of the list, and, with reference to the carbohydrates, contains on an average fully 50% of that found in many fresh fruits. These facts alone would warrant due consideration of the value of the avocado as a fresh fruit. The chief value of the avocado as food is due to its high content of fat. The only fruit comparable with the avocado in this respect is the olive. The energy values of the edible portion of the commonly used fresh fruits are low, ranging from a minimum of 175 calories to a possible maximum of 400 calories per pound. The avocado has a far higher value in this respect, the average for 20 varieties being 1056 calories per pound. It possesses practically 75% of the fuel value of cereals and far in excess of the fuel value of lean meat. Digestion experiments conducted by Mattill have shown that the digestion coefficient for avocado fat for man is 93.8, which is identical with the average obtained in connection with the digestibility of butter fat. Mattill also found that $\frac{1}{2}$ gm. of the avocado as a daily supplement to the standard vitamin B free diet, caused a recovery in the weight of rats which had been declining because of lack of this accessory food factor. [See also Bot. Absts. 13, Entry 2607.]—*A. R. C. Haas*.

6582. PETIT, M. **À propos du pincement des arbres fruitiers.** [Pinching of fruit tree buds.] Jour. Soc. Nation. Hort. France 23: 171-174. 1922.—A record is given of observations as to the effect of removing leaf buds on the development of fruit on young pear trees. Two branches with 20 fruits on each were selected. The one not disturbed developed 7 fruits and the other 16 fruits. It is stated that pinching prevented the fall of the young fruits and favored their development.—A discussion of the effects of reduced foliage on the water balance follows.—*H. C. Thompson*.

6583. PETIT, A. Sur la plantation des arbres fruitiers. [Planting fruit trees.] Jour. Soc. Nation. Hort. France 23: 84-87. 1922.—This is a discussion of the effects of cutting off the small roots of pear trees and apple trees at the time of planting. Experimental results are given which show less growth at end of 2 years when the small roots were removed than when they were not pruned at all. It is claimed that the fibrous roots are capable of producing new roots. This experiment was started to test a theory advanced by an American experimenter (not named) who claimed that it is only the larger roots which are capable of initiating new root growth.—*H. C. Thompson.*

6584. RIVIÈRE, GUSTAVE, ET GEORGES PICHARD. Contribution à la physiologie de la greffe. [The physiology of the graft.] Jour. Soc. Nation. Hort. France 23: 96-97. 1922.—In an experiment with pear trees the effects of the stock on the scion are briefly discussed. Scions of a late variety were grafted upon 2 early varieties and there was no material difference in time of ripening as compared with the same variety on its own roots.—*H. C. Thompson.*

6585. RIVIÈRE, G., ET GEORGES PICHARD. De l'influence de pincement des bourgeons feuillés du pommier Calville Blanc sur l'accroissement des fruits. [Influence of removing the leaf buds of apple tree (Calville Blanc) on the growth of fruits.] Jour. Soc. Nation. Hort. France 23: 226-228. 1922.—This refers to the removal of buds on the fruiting branch. Three apple trees of about the same vigor and number of fruits were selected in 1921 and treated in different ways as follows: (1) Buds removed above the 3rd or 4th leaf; 31 fruits produced weighed 5 kgm. 805 gm., or an average of 187 gm. each.—(2) Buds accompanying inflorescence left but all others above the 3rd or 4th leaves removed; 24 fruits produced weighed 4 kgm. 100 gm., or 170 gm. each.—(3) No buds removed. 25 fruits produced weighed 5 kgm. 0.039 gm., or 201 gm. each. The authors conclude that removal of buds during the growing season is useless and expensive.—*H. C. Thompson.*

6586. RIVIÈRE, GUSTAVE, ET GEORGES PICHARD. Influence de la couleur des murs d'espaliers sur la hâtivité de maturité des pêcheurs qui sont adossés. [Influence of the color of espaliers on the earliness of peaches trained on them.] Jour. Soc. Nation. Hort. France 24: 79-82. 1923.—Black walls hastened ripening of peaches more than white ones. Temperature of the soil in front of the black wall averaged considerably higher than in front of the white wall.—*H. C. Thompson.*

6587. SKINNER, J. J. Influence of soil type on the yield and quality of pecans. Jour. Amer. Soc. Agron. 16: 51-57. 1924.—Schley pecans produced better yields and a larger nut on Orangeburg sandy loam than on Norfolk sandy loam at Putney, Georgia. There was very little difference in percentage of meat, and in oil and protein content of meat from the nuts grown on the 2 soils. Alley pecans produced larger yields and a larger nut on Greenville sandy loam than on the Norfolk sandy loam at Putney, Georgia. Stuarts produced larger yields on Orangeburg sandy loam than on Ruston sandy loam at Putney, Georgia. The size, percentage of meat, and protein content of meat were practically the same in the nuts grown on the 2 soils. The oil content of the kernel was slightly higher in the nut from the Orangeburg soil. Frotscher and Money Maker pecans produced larger yields on the Greenville sandy loam and Norfolk sandy loam than on the Susquehanna sandy loam at Cairo, Georgia. The nuts were larger, better filled, and contained a higher oil and protein content on the 2 first types than on the last. There was practically no difference between the yield and quality of the nut grown on the Greenville and Norfolk soil. Schley pecans produced larger yields, and larger and better filled nuts on Greenville sandy loam than on Orangeburg sandy loam at Robertsedale, Alabama. The oil, protein, and sugar content of the kernel were practically the same in the nuts grown on the 2 soil types.—*F. M. Schertz.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

6588. BALCH, WALTER B. House plants and their care. Kansas Agric. Exp. Sta. Circ. 100. 1-16. 5 fig. 1923.—The culture, propagation and general care of house plants is discussed. A list of plants suitable for window boxes is listed.—*L. E. Melchers.*

6589. BELLAIR, M. G. Observation sur la resistance de quelques variétés de pommes de terre a la sécheresse. [Observations on the resistance of some varieties of potatoes to drought.] Jour. Soc. Nation. Hort. France 23: 197-199. 1922.—Observations during the very

dry season of 1921 indicated considerable differences among potato varieties in their resistance to drought. Some lost their leaves early while others retained them throughout the critical period.—*H. C. Thompson.*

6590. CERIGHELLI, R. *La farine des graines et la fécule des tubercules de l'Icacina senegalensis.* [Meal from the seeds and starch from the tubers of *I. senegalensis*.] *Ann. Mus. Colonial Marseille* 7: 169-178, 2 fig. 1919.—*Icacina senegalensis* (Olacaceae) is one of the widely distributed and characteristic plants of Senegambia and the region constituting the *brousse soudanienne*. Both seeds and tubers are used by the natives as food materials, particularly in time of scarcity of other foods. The seeds are prepared by macerating the fruits until the pulp is removed, after which the seeds are ground in a mortar, dried and made into a paste by stirring into boiling water. The meal contains 12.65% moisture, 7.8% protein, 72.36% carbohydrate, 0.08% fat, and 4.38% fiber and ash. The carbohydrate is chiefly starch. The microscopic appearance of the starch grains, which resemble those of the legumes, is described. The tubers are prepared for use by cutting in fragments and macerating in running water to remove a bitter principle of unknown nature, after which the pulp is dried in the sun, ground in a mortar and sifted. The flour thus obtained consists almost wholly of starch and is used in the preparation of pastes or cakes. The starch of the tubers is remarkable for the wide variations in size and form of the grains.—*Joseph S. Caldwell.*

6591. COCHET-COCHET, M. CH. *Les roses L'Egypte ancienne.* [Roses of ancient Egypt.] *Jour. Soc. Nation. Hort. France* 23: 269-273. 1922.

6592. FREE, MONTAGUE. *The rock garden.* Brooklyn Bot. Gard. Leaflets 12³: 1-4. 1924.—This paper, a reprint of 7⁴, 1919, with revisions and additions, describes the various species cultivated in the rock garden of the Brooklyn Botanic Garden, and gives a list of plants suitable for rock gardens in general.—*A. H. Graves.*

6593. GEROME, J. *Au sujet de l'origine botanique de quelques laitues à couper.* [Botanical origin of some varieties of cutting (leaf) lettuce.] *Jour. Soc. Nation. Hort. France* 23: 359-362. 1922.

6594. GUILLAUMIN, M. A. *Les Streptocarpus.* *Jour. Soc. Nation. Hort. France* 23: 303-314. 1922.—The author presents a description of the genus, its distribution, cultivated species, culture, with descriptions of the species, a key for identification, and a list of cultivated varieties or subspecies.—*H. C. Thompson.*

6595. GUILLAUMIN, A. *Principles et regles à observer pour nommer les plantes.* [Principles and rules for naming plants.] *Jour. Soc. Nation. Hort. France* 24: 244-250. 1923.

6596. MOTTET, S. *La multiplication asexuelle des glaieuls horticoles.* [Asexual propagation of gladioli.] *Jour. Soc. Nation. Hort. France* 24: 400-403. 1923.

6597. MOTTET, S. *Notes sur l'origine et l'évolution des races glaieuls à floraison estivale.* [Notes on the origin and evolution of summer flowering gladioli.] *Jour. Soc. Nation. Hort. France* 23: 363-368. 1922.

6598. MOTTET, S. *Notes sur l'origine, l'évolution et la culture des iris des jardins.* [Notes on the origin, evolution and the culture of garden iris.] *Jour. Soc. Nation. Hort. France* 24: 323-330. 1921.

VEGETABLE CULTURE

6599. AMET, A. V. *Types and tests of soil.* *Market Growers Jour.* 33¹¹: 18-21. 1923.

6600. BOUQUET, A. G. B. *Causes of heavy yields of greenhouse tomatoes.* *Market Growers Jour.* 33⁹: 14. 1923.

6601. DUTCHER, R. A. *Vitamins in vegetables and fruits.* *Market Growers Jour.* 33²: 5, 7. 1923.

6602. GARRAHAN, R. H. *The seed problem of the business vegetable grower.* *Market Growers Jour.* 33⁸: 3, 5, 7. 1923.

6603. GILLIS, M. C. *Rate of planting garden beans.* *Market Growers Jour.* 32⁸: 24. 1923.—A one year test indicated that garden beans thinned to 6 plants per foot of row give a higher yield than 2 or 3 to the foot. Red Valentine, Burpee's Stringless Greenpod, and Refugee were used in the test.—*H. C. Thompson.*

6604. GUSTAFSON, A. F. *Growing vegetables with less manure.* *Market Growers Jour.* 31²: 5, 6; 31³: 5, 6. 1922.

6605. HARVEY, R. B. **Varietal differences in hardiness.** *Market Growers Jour.* 30⁷: 14, 16. 1922.—A brief discussion points out differences among varieties of cabbage, tomato, Chinese cabbage and lettuce, and suggests factors contributing to hardiness. Jersey and Charleston Wakefield cabbage have been found to possess superior winter resistance in the Norfolk, Virginia, region. These 2 varieties and Danish Ballhead harden much more quickly than All Season, Zittauer, or Danish Stonehead (Red). Mammoth Red hardens very well, but none of these is as hardy as Jersey Wakefield. Varieties of tomatoes with thick skin, such as Livingston's Globe and Trucker's Favorite, are but little inclined to crack and are less easily frozen than thin-skinned varieties such as Earliana. Tests made upon the Paoting, Peking, Shantung, Chosen, and Chorurei varieties of Chinese cabbage showed little difference in hardiness. All varieties of Chinese cabbage are more susceptible to frost than the ordinary cabbage. In a test of 50 varieties of lettuce great difference in hardiness was found.—*H. C. Thompson.*
6606. KEIL, J. B. **Vegetable cultivation.** *Market Growers Jour.* 32⁵: 15, 17. 1923.—A report is made of experimental results at Wooster, Ohio, for 3 seasons, comparing mulch, cultivation, and scraping.—*H. C. Thompson.*
6607. LEONARD, M. D. **Spraying pickling cucumbers for profit.** *Market Growers Jour.* 31⁹: 7. 1922.
6608. LLOYD, J. W. **Factors that produce quality melons.** *Market Growers Jour.* 30⁷: 5, 6. 1922.—The author points out that melons now reaching the market are of better quality than formerly, and that this has had the effect of increasing consumption. Factors mentioned as affecting quality are (1) strains grown; (2) condition of vine at time of maturity, which is affected by fertilizers, soil, moisture, diseases, and insects; (3) stage of maturity when harvested; and (4) care in handling.—*H. C. Thompson.*
6609. LLOYD, J. W. **Nipping melon vines not profitable.** *Market Growers Jour.* 32¹: 8. 1923.—In 5 out of 8 tests, nipped vines produced a larger yield than those not nipped, but the total yield of *early* melons was smaller from the nipped vines. The average total yield (early and late melons) per hill was 3.14 pounds for nipped and 3.49 pounds for those not nipped.—*H. C. Thompson.*
6610. ROSA, J. T., JR. **Some advantages in using old seed.** *Market Growers Jour.* 30⁸: 6. 1922.
6611. SCHNECK, H. W. **Some tests of melon varieties.** *Market Growers Jour.* 30⁷: 6, 7. 1922.
6612. THOMPSON, H. F. **Dandelions as a market crop.** *Market Growers Jour.* 33²: 12. 1923.
6613. THOMPSON, H. C. **Fertilizing muck land vegetables.** *Market Growers Jour.* 31⁵: 11. 1922.
6614. THOMPSON, H. C. **Suckering sweet corn unprofitable.** *Market Growers Jour.* 30¹⁰: 16. 1922.—Results of 3 years' experimental work at Ithaca, N. Y., with the Golden Bantam and Stowell's Evergreen varieties show decrease in yield from removing suckers, such decrease being roughly proportional to the amount removed and to the lateness of removal. There was no consistent difference in earliness and practically none in size of ears.—*H. C. Thompson.*

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 6453, 6488, 6590, 6693, 6791)

6615. ARBER, AGNES. **Tendrils of Smilax.** *Bot. Gaz.* 69: 438-442. *Pl.* 22. 1920.—In this paper the conflicting views hitherto held regarding the nature of the tendrils of *Smilax* are summarised and briefly criticised. It is concluded, on grounds of anatomy and external morphology, that these tendrils are equivalent in morphological value to the petiole, and have arisen through choris or *dédoublement* of that organ. Incidentally, attention is called to the prevalence among Monocotyledons of a leaf-limb with a cordate or sagittate base, such as that of *Smilax*.—*Author.*

6616. ARTSCHWAGER, ERNST. Use of chloriodide of zinc in plant histology. Bot. Gaz. 71: 400. 1921.—A 2-solution mixture as follows, which was first suggested by Novopokrowsky, has always given uniformly good results: Solution A, iodine potassium iodide 1:1:100; solution B, zinc chloride 2 parts, water 1 part. The object is stained in solution A for a few seconds and then transferred to solution B, where it is kept moving until a bright blue color is obtained.—*Author.*

6617. CHOLODNY, N. Über die vegetative Vermehrung von *Sempervivum soboliferum*. [Vegetative reproduction of *S. soboliferum*.] Beih. Bot. Centralbl. I Abt. 40: 161-173. 4 fig. 1924.—This plant rarely blooms, but reproduces vegetatively. In the axils of the older leaves, slender leafless runners, each with a bud at the tip, develop. The runner is semi-permanent. Separation of the young individuals from the mother plant rarely occurs without outside help. Wind is not important, but the author holds that the falling of pine cones is the means of breaking the runner and removing it to some distance from the mother plant.—*L. Pace.*

6618. DORSEY, M. J., AND FREEMAN WEISS. Petiolar glands in the plum. Bot. Gaz. 69: 391-406. Pl. 20-21. 1920.—This investigation includes a study of the glands which are used extensively in making varietal and specific distinctions in *Prunus*. A study was made of the status of glands in over 30,000 leaves belonging to 15 species and interspecific hybrids. The typical condition was found to be 2 glands on the petiole, or less frequently 2 on the leaf base. The vascular connections of the glands on the petiole showed that they are of a different order from those of the glands on the serrations. The shedding of a part of the node bearing the stipules and leaf scars is interpreted as showing them not to be additional foliar elements. On the basis of nodal anatomy and the presence of reduced structures, the ancestral leaf type in the plum is suggested as being a ternate lobed or divided simple leaf, the petiolar glands, which were shown statistically to be present typically in pairs, representing the suppressed lateral members.—*M. J. Dorsey.*

6619. HAINING, HULDA I. Development of embryo of *Gnetum*. Bot. Gaz. 70: 436-445. Pl. 39-41, 1 fig. 1920.—In the ripe seeds of *Gnetum* sp. 15, sp. 29 and sp. 59 of the Buitenzorg Botanic Garden, the proembryo consists of a coiled bundle of tubular structures, the primary suspensors, packed in a corrosion cavity. Near the tip of each of these primary suspensors is a large nucleus, and pressed against the end wall, a peculiar pear-shaped cell. At germination this cell pushes out from the swollen tip of the tube and forms a long multicellular suspensor. At the meristematic end of this ribbon of tissue the embryo body is differentiated. Comparisons are made with the development in other species of the genus, in which the suspensors ramify the nucellus without forming a corrosion cavity. Polyembryony is described.—*H. I. Felzer.*

6620. JURICA, HILARY S. Development of head and flower of *Dipsacus sylvestris*. Bot. Gaz. 71: 138-145. 14 fig. 1921.—*Dipsacus sylvestris* is characterized by a mode of branching uniform for each individual plant. The new branches arise from the axils of leaves clasping the stem. As soon as the initials of the new branches make their appearance in the axils, a twofold region of elongation sets in immediately above and below the initials. Secondary branches are formed early and similarly in the axils of leaves clasping the new branches. The floral head or capitulum which terminates each branch, is the first to make its appearance in the developing of that branch. The primordia of the bracts forming the involucre of the capitulum appear early and are followed quickly by the initials of clasping leaves. The initials of floral bracts appear before the papillae of the individual flower which they subtend. The flowers are arranged in the form of a spiral and are unique in their method of blossoming, i.e. in beginning at the middle and progressing both ways. The order of succession of floral members is: corolla, stamens, calyx, carpels—the calyx appearing almost simultaneously with the stamens. The individual flowers forming the capitulum have, investing the ovary, a calyx-like involucre the initials of which appear shortly after the initials of the calyx. Comparisons are made on the order of succession of floral parts in 10 genera.—*Author.*

6621. KOSTYTSCHEW, S. Der Bau und das Dickenwachstum der Dikotylenstämme. [Structure and diameter increment in the stem of dicotyledons.] Beih. Bot. Centralbl. I Abt. 40: 295-350. 33 fig. 1924.—The stems of dicotyledons develop by forming either a procambium

ring or individual procambium bundles in the embryonic region of the tip. These embryonic structures determine the structure of the stem. Separate procambium bundles do not produce a continuous ring of wood and bast. Procambium is distinguished from ring cambium by the irregular arrangement of its cells, division planes occurring in all directions. The ring cambium may develop in the procambium before the first spiral and ringed elements and sieve vessels, but it is often later or may be formed at the same time. It always precedes leaf traces if these appear at all. Separate procambium bundles appear in the parenchyma, are oval in shape and have true pith between them. Later, separate vascular strands are formed but not continuous wood and bast rings. The normal dicotyledonous type has the closed procambium ring and may be divided into several groups. In the 1st group, in which 73 species are described, the procambium develops into a continuous ring of wood and bast. Most of the Scrophulariaceae are of this type. The 2nd group, including only 3 of the 133 species investigated, has separate leaf traces and interfascicular cambium. The 3d group contains plants with a closed vascular ring. The mechanical conducting tissues are in different parts of the ring. This type is best developed in the Umbelliferae and Cruciferae. Forty-four species are placed in this group. The last group includes plants without a closed procambium ring. Water and swamp plants with little water conduction belong here, but some land plants have a similar structure.—*L. Pace.*

6622. LANGDON, LADEMA M. Sectioning hard woody tissues. Bot. Gaz. 70: 82-83. 1920.—The author presents a method of preparing hard or refractory tissues for sectioning, which assures more uniform results and less difficulty in securing serial sections than the customary celloidin method. The essential steps in this schedule are: (1) Fixation, followed by demineralization and general softening of lignified structures through the use of hydrofluoric acid. Special attention is given to the action of this demineralizing agent (in pure and dilute form) on different types of woody tissues, and to the time of immersion of tissues in the acid. (2) Removal from the softening medium is followed by thorough washing, dehydration with alcohols, and clearing in xylol. Five grades of alcohol, 60, 70, 80, 95, and 100% for 12 hours each, and 4 grades of xylol, allowing 12-24 hours for each are generally sufficient for such histological work. To insure perfect infiltration, any air or gases remaining in the tissues should be removed by means of a vacuum pump while the material is in pure xylol. (3) Infiltration with paraffin, and sectioning, preferably with a sliding microtome. Thorough and careful infiltration with paraffin is emphasized. A rotary microtome may be used for sectioning if the embedded objects are small and have much soft tissue, but the sliding microtome has given greater satisfaction in dealing either with hard woody tissues or with non-homogeneous objects. With proper infiltration, sections of the most refractory tissues ranging from 10 to 30 μ in thickness may be cut with a sliding microtome, and a complete series obtained. Full directions are given for the securing of serial sections. Straightening of sections on slides is accomplished in the usual manner.—*Author.*

6623. LEHMBERG, KARL. Zur Kenntnis des Bau und der Entwicklung der wasserleitenden Bahnen bei der Sonnenblume (*Helianthus annuus*). [Structure and development of the water-conducting tissue in the sunflower.] Beih. Bot. Centralbl. I Abt. 40: 183-236. Pl. 2-5. 1924.—The basal part of each cotyledon of the sunflower has 4 vascular bundles, 2 median and 2 lateral. On entering the hypocotyl, the 2 adjacent lateral bundles unite. Between the 2 median bundles in each case is an isolated vessel without a sieve portion, the *vaisseau alterne*. In passing into the tetrarch root the *vaisseau alterne* and the 2 adjacent median bundles unite in one of the root bundles. The foliage leaves have at the base 3 bundles, 1 median and 2 lateral. These are in the same order in the stem, and the leaf trace extends for at least 1 internode as a simple bundle. The traces sometimes extend for 5 internodes in the upper part of the stem. The leaf traces unite between the lateral and median traces of the cotyledons, in the upper hypocotyl, into 4 bundle complexes that unite with the median bundles.—The stem structure is described.—A seedling 2 cm. long has no vascular elements. The 1st to be differentiated is the *vaisseau alterne*, then the lateral traces. About the same time the spiral vessels are developed in the upper root and later a regular development continues with root growth. In passing from root to stem no rotation of the vascular parts occurs, and no *vaisseau alterne* is found. In leaves 2 mm. long there are no spiral thickenings, the 1st spiral vessels

being found in the mid-vein in leaves somewhat longer and extending from the tip into the stem for as much as 5 mm.—*L. Pace*.

6624. LEITMEIER-BENNESCH, BERTHA. Beiträge zur Anatomie des Griffels. [Studies on the anatomy of the style.] Sitzungsber. Akad. Wiss. Wien [Math. Nat. Kl.] I Abt. 131: 339–356. 1 pl., 13 fig. 1922.—The presence of a well-developed cuticle lining the canal which traverses the style was found to be a characteristic feature of certain genera of monocotyledons, such as *Narcissus*, *Leucojum*, *Galanthus*, *Gladiolus*, *Crocus* and *Canna*; but was absent from *Iris*, from all but one of the liliaceous genera studied and from 2 species of orchids. In a number of liliaceous species a druse-containing tissue was found to line the stylar canal. In *Echeveria* an ethereal oil nearly fills the canal. In *Nicotiana affinis* and *Calla aethiopica* the epidermis of the style was strongly lignified. Stomata were found to be of frequent occurrence in the stylar epidermis.—*F. Weiss*.

6625. MILSUM, J. N. The flowering of tuba, *Derris elliptica* Benth. Malayan Agric. Jour. 12: 16. 1924.—Although this species rarely flowers in the Malay Peninsula, a young plant bloomed at the Serdang Experimental Plantation, the flowers appearing with the new leaves after a short dormant period. No fruit was formed.—*R. E. Holtum*.

6626. MORVILLEZ, F. La feuille des plantes supérieures correspond-elle toujours à un organe simple? [Does the leaf of the higher plants always correspond to a simple organ?] Compt. Rend. Soc. Biol. 90: 433–435. 1924.—While admitting that the leaves of the gymnosperms and pteridophytes are a single morphological unit, the study of the base of the leaf of various angiosperms shows vestiges of a primitive organization indicating that the leaf in these forms has come from the fusion of a number of elementary organs.—*Oran Raber*.

6627. SIFTON, H. B. Some characters of xylem tissue in Cycads. Bot. Gaz. 70: 425–435. Pl. 37–38, 1 fig. 1920.—Pitting in *Cycas revoluta* and *Dioon spinulosum* was investigated. In the primary wood, pitting of the *Lyginodendron* and Cordaitan type was observed in the process of development from the scalariform. Grouped and scattered pits are seen in both primary and secondary wood, the result of an elimination process. Opposite and alternate pitting occur indiscriminately and are believed by the writer to have originated from horizontal and diagonal scalariform pits, respectively. Bordered pits at the ends of tracheids and those in contact with parenchyma are more primitive. Araucarian bars of Sanio are noted in both primary and secondary wood. In addition the secondary wood contains, in places, an elongated bar. Tertiary thickenings and trabeculae are present.—*Author*.

6628. WALKER, ELDA R. The gametophytes of *Equisetum laevigatum*. Bot. Gaz. 71: 378–391. Pl. 23–24, 3 fig. 1921.—Gametophytes were found in large numbers in natural habitats, each consisting of a circular disk of compact tissue 1–10 mm. in diameter. The upper surface is covered by numerous upright green branches. A peripheral band of meristem continues the growth of the thallus and produces archegonia and antheridia. All gametophytes bear archegonia; most of them also bear antheridia. The 2 sex organs occur irregularly on the meristem ring and often lie within a few cells of each other. Antheridia and archegonia continue to develop until the growth of sporophytes exhausts the thallus.—*Author*.

6629. WHITAKER, EDITH S. Experimental investigations on birch and oak. Bot. Gaz. 71: 220–235. Pl. 12–15, 4 fig. 1921.—Wound reactions in the birch and oak are considered with reference to conservative regions (root, leaf, etc.), seedling condition, and fossil record. The reversion here studied is the aggregate ray, which appears as a result of wounding in both birch and oak, and which is to be found also in the seedling, in fossil representatives, and in conservative regions. It would seem, therefore, to be the primitive type of ray from which the compound ray of the oak and the diffuse ray of the birch were derived by different evolutionary processes. In the birch where the wound heals quickly and the hypertrophy is marked, the reversionary aggregate rays appear opposite the wound; in the oak they occur in the wound cap itself.—*E. W. Bancroft*.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 6460, 6466, 6487)

6630. CARTER, NELLIE. A Monograph of the British Desmidiaceae—by the late W. West and the late G. S. West. Vol. V. xxi + 300 p., 39 pl. Trickett, Wesley Co. for the Ray Society: London, 1923.—This is the last volume of the Monograph and contains descriptions of the 134 species of the genus *Staurastrum* not dealt with in Vol. IV, together with treatment of the genera *Cosmocladium*, *Oocardium*, *Sphaerososma*, *Onychonema*, *Spondylosium*, *Hyalotheca*, *Desmidium*, and *Gymnozyga*. Every species and nearly all the varieties are figured. Two new varieties are described for the 1st time, namely, *Staurastrum bacillare* Bréb. var. *undulatum*, and *Sphaerososma excavatum* Ralfs var. *subquadratum*. There are few changes in nomenclature: *Staurastrum tetracerum* var. *evolutum* becomes var. *evolutum* of *S. paradoxum* Meyen; *Cosmocladium subramosum* Schmidle is merged in the earlier described species, *C. pusillum* Hilse; *Onychonema Nordstedtianum* Turn. is placed under *O. filiforme* (Ehr.) R. & B., and *Spondylosium monile* Turn. becomes var. *monile* of *S. pygmaeum* (Cooke) West. The addenda deal with recent changes concerning the genera described in the earlier volumes, and there is an index to the whole work.—*Author*.

6631. HARRIS, G. T. The fresh-water algae of Devonshire. Trans. Devonshire Assoc. Adv. Sci. Lit. and Art 52: 263–277. 1920.—This paper reviews the work done on the fresh-water algae of Devonshire from the earliest records published in 1829 up to the present time, when the recorded algal flora may be estimated as totaling 800 species with some varieties. Of this number, 500 are members of the Desmidiaceae, 80 of the Myxophyceae and the remainder of the Chlorophyceae. Devonshire as a collecting ground and as a source of rare or new species is discussed. The author gives some special notes regarding the following species: *Hammatoidea normanii*, *Hydrurus pennicillatus*, *Volvox aureus*, *V. globator*, *Palmodyctyon viride*, *Trentepohlia aurea*, *Coelastrum reticulatum*, *Kirchneriella obesa*, *Hildenbrandtia rivularis*, *Botryococcus Braunii*, *Desmidium cylindricum*, *Gongrosira scoufieldii*, *Staurastrum orbiculare*, and *Batrachospermum atrum*. The paper concludes with a list of 130 new records for the county.—*A. F. Hill*.

6632. HEITZMANOWNA, WANDA. Nowe stanowisko krasnorosta Ceramothamnion Codii Richards w zatoce gdąnskiej. [New station for the red alga Ceramothamnion Codii Richards in the Gulf of Danzig.] Acta Soc. Bot. Poloniae 1: 93–96. 1923.

6633. NICHOLS, SUSAN P. The filamentous green algae, a neglected group of Maine plants. Main Naturalist 3: 56–60. Pl. 1. 1923.

6634. SAMPAIO, GONCALO. Subsídios para o estudo das “Desmidiáceas” portuguesas. [Foundations for the study of Portuguese desmids.] Bol. Soc. Broteriana 28: 151–163. 1 col. pl. 1920 [1921].—The list embraces 55 species collected in the autumn of 1911 in the vicinity of S. Gens de Calvos and does not pretend to be exhaustive; 42 species are additions to the Portuguese flora. All species are described, with collection-data, and the new forms are figured. The latter are: *Penium teres*, *Closterium subacutum*, *C. minianum*, *C. ulnoides*, *C. lusitanicum*; the authority being Sampaio in all cases. At the close of article the author lists the 51 species reported from Portugal by West in No. 33 of NOTARISIA (1892).—*E. B. Chamberlain*.

6635. SAMPAIO, JOAQUIM. Desmidiáceas da bacia do Lima (I Série). [Desmids from the Lima basin.] Bol. Soc. Broteriana II, 1: 3–18. 1 pl. 1923.—The author lists 64 species of Desmids, with descriptions and collection-data, collected in autumn in a portion of the upper basin of the river Lima, between it and the Estorãos rivulet. Of the species listed 22 are new to the Portuguese flora and 4 new also to science. The new forms are:—*Penium exiguum* West f. *latum*, *Closterium cynthioides*, *C. limicum*, *C. lusitanicum* Samp. f. var. *minor*, *Tematmorus Brebissonii* Ralfs race *granulatus*, *Euastrum minianum*, *E. Henriquesi*, *Micrasterias denticulata* Bréb., var. *lusitanica*, *Arthodesmus crassus* W. & W. f. *minor*. The authority for all combinations is Sampaio fil.—*E. B. Chamberlain*.

6636. SCHRODER, BRUNO. *Beitrage zur Kenntnis der Algenvegetation der Moores von Groos-Iser.* [The alga flora of the Gross-Iser moors.] Ber. Deutsch. Bot. Ges. 37: 250-261. Pl. 2, 24 fig. 1919.—The 121 forms of algae reported from this region are grouped as follows: Schizophyceae 8, Flagellatae 9, Dinoflagellatae 2, Bacillariaceae 18, Conjugatae 61, Chlorophyceae 15, and Confervaceae 8. Of these, 39 forms were found on the flat moors, 88 on high moors, and the remainder at intermediate localities. *Cosmarium bioculatum* var. *omphalum* Schaarschmidt f. *minor*, *Staurastrum monticulosum* var. *variable*, *S. monticulosum* var. *simplex*, *S. rugulosum* var. *denticulatum*, and *S. Kobelianum* are reported as new.—L. H. Tiffany.

6637. SETCHELL, W. A., AND N. L. GARDNER. *New marine algae from the Gulf of California.* Proc. California Acad. Sci. 12: 695-949. Pl. 12-88. 1 map. 1924.—The material reported upon was collected mostly by I. M. Johnston in 1921 though this was supplemented by other available collections, notably those of T. S. Brandegee and Dr. and Mrs. Marchant. Very little material from the West coast of Mexico was available before this time. The Corallinaceae and the less conspicuous algae are reserved for future study. One new genus *Estebania* is described and the following new species, varieties, forms and combinations are made: *Chlorogloea regularis*, *Dermocarpa reinschii*, *D. marchantae*, *Xenococcus deformans*, *Hydrocoleum codicola*, *Clothrix nodulosa*, *C. nidulans*, *Caulerpa ranbosseae*, *Halimeda discoidea*, *Codium simulans*, *C. conjunctum*, *C. reductum*, *C. cuneatum*, *C. amplivesciculatum*, *C. unilaterale*, *C. longiramosum*, *C. anastomosans*, *C. brandegeei*, *C. cervicorne*, *Cladophora hesperia*, *Cladophoropsis robusta*, *Enteromorpha marchantae*, *Entocladia condensata*, *E. polysophoniae*, *E. mexicana*, *Pringsheimia marchantae*, *Ectocarpus bryantii*, *E. gonodioides*, *Gonodia sargasii* (Yendo), *G. moniliformis* (Fostie), *G. johnstonii*, *G. marchantiae*, *Compsomena immixtum*, *Sphacelaria brevicorne*, *Colpomena sinuosa expansissima*, f. nov., *Dictyota johnstonii*, *D. hesperia*, *Sargassum acinacifolium*, *S. guardiense*, *S. lapazeanum*, *S. bryantii*, *S. horridum*, *S. marchantae*, *S. insulare*, *S. brandegeei*, *S. sinicola*, *S. polyacanthum* f. *Americanum*, *S. johnstonii*, *S. johnstonii* f. *laxius*, *S. johnstonii* f. *gracile*, *S. cylindrocarpum*, *S. herporhizum*, *Gelidium johnstonii*, *G. decompositum*, *Gymnogongrus carnosus*, *Dicranema rosaliae*, *Callophyllis johnstonii*, *Callymenia pertusa*, *Anatheca elongata*, *Euclima uncinatum*, *E. johnstonii*, *Gelidiopsis tenuis*, *Gracilaria vivipara*, *G. pinnata*, *G. sinicola*, *G. johnstonii*, *G. pachydermatica*, *G. crispata*, *G. subsecundata*, *G. lacerata*, *Corallopsis excavata*, *Hypnea johnstonii*, *H. marchantae*, *Asparagopsis sanfordiana* f. *amplissima*, *Laurencia obtusiuscula*, *L. obtusiuscula* var. *corynibifera*, *L. obtusiuscula* var. *laxa*, *L. estebaniana*, *L. johnstonii*, *L. sinicola*, *L. papillosa* var. *pacifica*, *Chondria acrorhizophora*, *Polysiphonia marchantae*, *P. sinicola*, *Heterosiphonia sinicola*, *Colacodasya sinicola*, *Callithamnion endovagum*, *Ceramium procumbens*, *C. bicorne*, *C. sinicola*, *C. johnstonii*, *C. serpens*, *C. interruptum*, *C. caudatum*, *C. fimbriatum*, *C. horridum*, *Centroceras bellum*, *Grateloupia squarrulosa*, *G. acroidalea*, *G. howeii*, *G. johnstonii*, *Estebania conjuncta*, *Polyopes sinicola*, *Prionites abbreviata*, *Schizymenia johnstonii*, and *S. violacea*.—Roxana S. Ferris.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

6638. BARSALI, E. *Frammenti di epaticologia italiana (III).* [Notes on Italian hepaticology (III).] Bull. Soc. Bot. Ital. 1923: 68-69. 1923.—The first 2 papers of this series were published prior to 1918. In the present paper the author calls attention to our incomplete knowledge regarding the Hepaticae of the Marches [Ancona, Ascoli-Piceno, Macerata, and Pesaro and Urbino] in eastern Italy and gives a report on 2 small collections from Istria made by E. Weiss. These collections, from the Brenner-Carso Triestino and the island of Brioni near Pola, contain 11 and 4 species, respectively.—A. W. Evans.

6639. BRITTON, ELIZABETH G. *Syrhophodon parasiticus* (Schwaegr.) Besch. *Bryologist* 27: 34, 35. 1924.—The article reports the second discovery of fruiting material of the moss near Oviedo, Florida, describes the available characters of the fruit, corrects an error in Schwaegrichen's plate, and notes the favorite habitats of the moss.—E. B. Chamberlain.

6640. BROWN, MARGARET S. *Hepatics in Georgia*. *Bryologist* 27: 31-34. 1924.—Forty-one species collected in the town of Thomasville were determined by A. W. Evans; 20 are new to the state. The author gives a short description of the character of the surrounding country and lists the particular habitat for each species. In 3 cases the article records the 2nd station for the species in the United States.—*E. B. Chamberlain*.

6641. CHAMBERLAIN, E. B. *Notes*. *Bryologist* 27: 36. 1924.—The author notes the appearance of the *BRYOTHECA GALLICA*, a series of exsiccatae issued by G. Dismier, and lists the species included in the 1st fascicle of 25 numbers.—*E. B. Chamberlain*.

6642. EVANS, ALEXANDER W. *Notes on the Hepaticae of California*. *Proc. California Acad. Sci.* 13: 111-130. 1923.—These notes supplement Howe's work on the characteristics and distribution of California Hepaticae (Mem. Torrey Club 7. 1899). The species reported upon number 39, of which 16 do not appear in Howe's report. Each species is accompanied by data regarding stations and collectors, and numerous critical remarks are interspersed. One new combination, *Jungermannia pendletonii* (Pearson), is made, based on *Aplozia pendletonii* Pearson. The total number of species now known for California is 101.—*Roxana S. Ferris*.

6643. FLEISCHER, MAX. *Die Musci der Flora von Buitenzorg, zugleich Laubmoosflora von Java mit Berücksichtigung aller Familien und Gattungen der gesamten Laubmooswelt*. [Mosses of the Buitenzorg flora, likewise moss flora of Java, with a consideration of the families and genera of the entire moss world.] 4: i-xxxii, 1105-1729. 84 fig. E. J. Brill: Leiden, 1915-1923.—The first 3 volumes of this comprehensive work were published between 1902 and 1908; with the exception of a few signatures the present volume, which brings the work to an end, was delayed until 1918 or later, the last pages being dated January, 1923. In the introductory portion of the volume the author gives a classification of the mosses of the world, differing in certain respects from the classifications now in use and based as far as possible on phylogenetic data. He first divides the group into the Sphagnales (with 1 family and 1 genus), the Andreaeales (with 1 family and 3 genera), and the Bryales (with 84 families and 655 genera). The families of the Bryales are arranged in suborders, orders and order-groups, the orders (15 in number) being the following: Fissidentales (1 family), Dicranales (10), Pottiales (5), Grimmiaceae (1), Funariales (5), Schistostegales (1), Tetraphidales (1), Eubryales (16), Isobryales (22), Hookeriales (6), Hypnobryales (12), Buxbaumiales (1), Diphyssiales (1), Dawsoniales (1), and Polytrichales (1).—The general classification is followed by a detailed discussion of the Javan species belonging to the Hypnobryales, the Buxbaumiales, the Diphyssiales and the Polytrichales, and also those belonging to the families Leucomiaceae and Symphyodontaceae of the Hookeriales. A supplement takes up the Hypnodendraceae of the Eubryales and the Rhacopilaceae of the Isobryales, while an appendix gives a series of additions to the earlier volumes. In the discussion of the Javan species numerous forms from other parts of the world are introduced for comparison, and the relationships of the genera and higher groups are fully indicated, even when these have no representatives in the Javan flora. The families of the vast order Hypnobryales, at present known from Java, are the following: Fabroniaceae (2 genera, 5 species), Leskeaceae (2 genera, 2 species), Thuidiaceae (5 genera, 15 species), Amblystegiaceae (1 genus, 1 species), Brachytheciaceae (6 genera, 12 species), Entodontaceae (4 genera, 7 species), Plagiotheciaceae (2 genera, 2 species), Sematophyllaceae (16 genera, 74 species), Hypnaceae (9 genera, 47 species), and Hylocomiaceae (1 genus, 2 species). The Leucomiaceae and Symphyodontaceae are each represented by a single species, the Hypnodendraceae by 2 genera and 8 species, the Rhacopilaceae by 1 genus and 3 species, the Buxbaumiaceae and Diphyssiaceae of the Buxbaumiales by 1 species each, and the Polytrichaceae of the Polytrichales by 3 genera and 10 species. The new genera proposed, with the number of species referred to each, are as follows: *Acanthocladiella* (1); *Acanthorrhynchium* (9); *Aptychopsis* (1); *Chaetomitriopsis* (1); *Clastobryopsis*, afterwards replaced by the older name *Aptychella* of Herzog (7); *Ctenidiadelphus* (2); *Ectropotheciopsis* (Broth.), based on *Trichosteleum* § *Ectropotheciopsis* Broth. (2); *Eurhynchiella* (10); *Glossadelphus* (18); *Macrothamniella* (1); *Platyhypnidium* (17); *Pseudohypnella* (1); *Rhaphidostichum* (5); *Rhizohypnella* (1); *Schraderobryum* (4); *Taxiphyllum* (10); *Thuidiopsis* (10); and *Trachythecium* (5). The new species and varieties proposed number 88; they are based on Javan material and bear the author's name as

authority, unless otherwise indicated in the following list: *Acroporium falcifolium*, *A. hamulatum*, *A. monoicum* var. *laxiretum*, *A. oxyporum* var. *minus*, *Barbella Koningsbergeri*, *Brachythecium gracillimum*, *Clastobryella tenella*, *Clastobryopsis brevinervis*, *C. delicata* (Broth.) [based on *Symphyodon delicatus* Broth. ms.] of the Himalayas, *C. heteroclada*, *C. prolifera* (Broth.) [based on *Sematophyllum proligerum* Broth.] of Colombia, *Clastobryum conspicuum*, *Ctenidium malacabolum* var. *robustum*, *C. plumicaule*, *Didymodon Loeskei*, *Ectropothecium epiphytum*, *E. lonchocormum* (C. M.) Broth. [based on *Cupressima lonchocormus* C. M. ms.], *E. mollissimum*, *E. Penzgianum* var. *ringens*, *E. Seuberti*, *Entodon Seubertianus* (C. M.) [based on *Pilosium Seubertianum* C. M. ms.], *E. tobaënsis* of Sumatra, *Glossadelphus amboinensis* of Amboinia, *G. hermaphroditus*, *G. Zollingeri* vars. *filicaulis* [based on *Ectropothecium filicaulis* Fleisch.] and *mollis*, *Hypnodendron gedehense*, *H. microvagum*, *H. opacum*, *H. pseudo-arborescens* of Borneo, *Isopterygium allescens* var. *applanata*, *I. applanatum*, *I. arquifolium* var. *pusilla*, *I. battakense* of Sumatra, *I. cratericola*, *I. fallax* of Ceylon, *I. planifolium*, *I. serrulatum* (Broth.) [based on *Plagiothecium serrulatum* Broth. ms.] of the Himalayas, *Meiothecium bogoriense*, *M. gymnostomum*, *M. Jagori* var. *tenuis* (Geheeb) [based on *M. Jagori forma sterilis tenuis* Geheeb ms.], *M. turgidellum*, *Pelekium calcicola*, *P. tenue* of Celebes, *Plagiothecium neckeroideum* var. *javensis*, *Pleuridium Valetonii*, *Pogonatum atrichoides*, *P. microphyllum* var. *integrifolia* Broth., *Pohlia Hampeana* var. *ardjoenensis* [based on *P. ardjoenensis* Fleisch.], *Pseudoleskeopsis Osterwaldii*, *Rhacopilum cuspidigerum* vars. *abbreviata* and *demissa* (v. d. B. & Lac.) [based on *R. demissum* v. d. B. & Lac.], *R. epiphyllum*, *Rhizohypnella sundaënsis*, *Rhynchostegiella brachypodia*, *R. sumatrana* of Sumatra, *R. Vriesei* var. *involutifolia*, *Schwetschkeia gracillima* of Sumatra, *S. javensis*, *Sematophyllum microcladiella*, *Taxiphyllum punctulatum*, *Taxithelium magnum*, *T. papillisetum* of New Guinea, *Thuidium batakenense* of Sumatra, *T. cymbifolium* var. *prostratum*, *T. glaucinoides* var. *verrucosa*, *Trachythecium calcicola* of Malacca, *T. verrucosum* var. *tjibodense*, *Trichosteleum elegantissimum* with the new var. *scabriseta*, *T. hamatum* vars. *glabriseta* and *tuberculiseta*, *T. longisetulum*, *T. pseudo-mammosum*, *Trismegistia brachyphylla* of Sumatra, *T. Brauniana* (v. d. B. & Lac.) [based on *Hypnum rigidum* var. *Braunianum* v. d. B. & Lac.], *T. lancifolia* var. *Korthalsii* (Dz. & Mkb.) [based on *Hypnum Korthalsii* Dz. & Mkb.], *Vesicularia Dubyana* vars. *abbreviata* and *cochlearifolia*, *V. padangensis* of Sumatra, *V. plicaeifolia*, *V. subscatiginosa*, *V. tepida* [based on *Ectropothecium Chamissonis* var. *tepida* Fleisch.], *V. thermophila*, *V. tjibodensis*, and *Warburgiella cuspidatifolia*. In addition to the new species and varieties many new combinations are necessitated by the establishment of the new genera and by the transfer of species from one genus to another.—Interspersed among the descriptions the author gives numerous data regarding the occurrence of dwarf male plants in the mosses and the segregation of the sexes in the spores [see also Bot. Absts. 9, Entry 876]. The latter condition is sometimes accompanied by heterosporry, in which the male spores are larger than the female. In most cases of heterosporry both male and female spores occur in the same capsule, but in *Ctenidium polychaetum* (v. d. B. & Lac.) Broth. a still more advanced condition is reached, the large male spores and the small female spores being here developed in different capsules. It is pointed out that this state of affairs is comparable to the phenomenon of dioecism among the spermatophytes.—A. W. Evans.

6644. HESSELBO, AUG. Mosses collected on the north-coast of Greenland by the late Dr. Th. Wulff. Meddel. om Grønland 64: 271-277. 1923.—The collection here reported upon was made in 1917 at latitudes varying from 82° 27' to 83° 6'. The species listed include 16 hepatics and 51 mosses. Of these, 3 of the hepatics and 7 of the mosses are designated as arctic in their distribution, 4 of the hepatics and 23 of the mosses as arctic-alpine, and the remainder as north temperate species of wide distribution.—A. W. Evans.

6645. HESSELBO, AUG. Some mosses from N. W. Greenland (Wolstenholme Sound and Inglefield Gulf). Meddel. om Grønland 64: 217-220. 1923.—The report is based on collections made in the vicinity of Thule Station in Wolstenholme Sound, Greenland, by P. Freuchen, L. Koch, and J. N. Nygaard, supplemented by a collection made in Inglefield Gulf by G. Olsen. The list of species includes 12 hepatics and 37 mosses. Most of these are northern species of wide distribution, but 4 of the hepatics and 5 of the mosses are designated as exclusively arctic.—A. W. Evans.

6646. JONES, D. A. Annual meeting of the British Bryological Society, 1923. *Bryologist* 27: 35, 36. 1924.—The author notes the more interesting bryophytes collected at the 1923 meeting of the Society at Buxton, Derbyshire.—*E. B. Chamberlain*.

6647. LID, JOHANNES. *Sphagna* from Novaya Zemlya. With an appendix by E. JØRGENSEN: Some mosses from Novaya Zemlya. *Rept. Sci. Results Norwegian Exped. Novaya Zemlya* 1921. 20: 1-7. 1924.—The collection of *Sphagna* here reported upon was made by B. Lynge and includes 3 species: *S. fimbriatum* var. *concinnum*, *S. squarrosus* and *S. Warnstorffii*. These are apparently the only species definitely known from Novaya Zemlya, and the author discusses their distinctive features and local distribution. In the appendix 2 hepatics and 15 mosses are listed.—*K. M. Strøm*.

6648. MASSALONGO, C. *Prospetto analitico della epaticologia italiana*. [Analytical synopsis of Italian hepaticology.] *Atti Reale Ist. Veneto Sci. Lett. Arti* 83: 135-170. 12 fig. 1923.—The author calls attention to the work done on Italian Hepaticae since the publication of his earlier report in 1886. At that time only 210 species could be definitely recorded from Italy; at the present time 257 species are known—a gain of over 20%. These species and the genera to which they belong are grouped in families, arranged in the following sequence: Anthocerotaceae (2 genera, 6 species), Jubulaceae (5 genera, 13 species), Madothecaceae (1 genus, 6 species), Radulaceae (1 genus, 3 species), Scapaniaceae (2 genera, 22 species), Ptilidiaceae (5 genera, 7 species), Lepidoziaceae (2 genera, 5 species), Calypogeiaceae (1 genus, 5 species), Cephaloziaceae (8 genera, 30 species), Jungermanniaceae (23 genera, 84 species), Fossombronaceae (1 genus, 3 species), Petalophyllaceae (1 genus, 1 species), Pelliaceae (2 genera, 4 species), Blyttiaceae (2 genera, 4 species), Metzgeriaceae (1 genus, 3 species), Aneuraceae (1 genus, 5 species), Riellaceae (1 genus, 1 species), Sphaerocarpaceae (1 genus, 1 species), Marchantiaceae (15 genera, 22 species), and Ricciaceae (4 genera, 29 species). Of these families the 1st is assigned to the order Anthocerotales, the next 17 to the Jungermanniales, and the last 2 to the Marchantiales. The formal enumeration of the species is followed by a series of critical notes, dealing more particularly with the recent additions to the Italian flora. These notes include a synopsis of Douin's last publication on the family Cephaloziellaceae [see Bot. Absts. 10, Entry 1838] and a key to the Italian species of *Fossombronina*. Three reductions of species to varietal rank are indicated, as follows: *Aneura pinguis* var. *crinita* (C. Mass.), based on *A. crinita* C. Mass.; *Jungermannia ventricosa* var. *confertifolia* (Schiffn.), based on *Lophozia confertifolia* Schiffn.; and *Reboulia hemisphaerica* var. *Charrieri* (C. & R. Douin), based on *R. Charrieri* C. & R. Douin. The figures illustrate *Aneura pinguis* var. *crinita* and *Riccia melitensis* C. Mass.—*A. W. Evans*.

6649. PARLIN, JOHN C. Maine mosses. *Maine Nat.* 3: 60-61. 1923.—The author lists 44 species of Maine mosses, with occasional notes on frequency. The list is based on his own 1922 collections, made at Albion, Freedom, Machias and Thorndike.—*A. W. Evans*.

6650. PARLIN, J. C. Miscellaneous notes. *Maine Nat.* 4: 29-34. 1924.—The paper is based on observations and collections made in Maine during 1923. It contains notes on a few lichens and flowering plants and lists 8 lichens, 9 hepatics and 27 mosses, mostly from Freedom and Machias.—*C. A. Weatherby*.

6651. POTIER DE LA VARDE, R. Muscinées annamites récoltées par M. Poilane. [Bryophytes of Anam collected by Mr. Poilane.] *Bull. Mus. Hist. Nat. [Paris]* 29: 397-404. 4 fig. 1923.—The collection here reported upon was made in the vicinity of Nhatrang, Anam. It includes 28 mosses and 2 hepatics, 1 of the latter being indeterminable. The following mosses are proposed as new, the authorities in each case being Thériot & Potier de la Varde: *Astomum tonkinense* var. *Poilanei*, *Calymperes pachyphyllum*, *Endotrichella Poilaneana*, *Garovaglia spinifera*, and *Leucoloma amoene-virens* var. *humilis*. Of the remaining species *Hypnodendron Copelandii* Broth., *Mniodendron divaricatum* (Hornsch. & Reinw.) Lindb. and *Taxithelium Lindbergii* (Br. jav.) Ren. & Card. are reported for the 1st time from the Asiatic continent, having been heretofore known only from the East Indian Islands. Descriptions, critical notes and data regarding stations are included; and, in connection with the new *Endotrichella*, a key to the 4 species of the genus, now known from Indo-China, is given. The figures illustrate the 3 new species and also *Endotrichella fragarioides* Par., *Garovaglia plicata* (Nees) Endl. and *Hypnodendron Copelandii*.—*A. W. Evans*.

6652. THÉRIOT, I. *Reliquiae Renauldianae*. Bull. Mus. Hist. Nat. [Paris] 29: 456-461. 1923.—The paper is based on a series of undetermined African mosses from Madagascar, Réunion, Mauritius and Grand Comoro Island. The specimens, now in the possession of the Museum of Natural History at Paris, came from the herbarium of F. Renauld. Of the 19 species or varieties reported upon, the following are proposed as new, Thériot being the authority in each case: *Dicranella borbonica* vars. *comorensis* (Grand Comoro) and *madagascariensis* (Madagascar), *Ectropothecium regulare* vars. *angustifolium* (Mauritius) and *laxitextum* (Réunion), *Isopterygium molle* (Réunion), *Leucoloma Forsythii* (Madagascar), *L. pallidulum* (Mauritius), *L. Rutenbergii* var. *porosis* (Mauritius), *L. Villaumei* (Madagascar), *Schlotheimia Gaultieri* (Grand Comoro and Madagascar), *Trichostomum Renauldii* (Réunion), and *T. Villaumei* (Madagascar). Of the remaining species listed, 4 came from Madagascar and 3 from Réunion. Each species is accompanied by data regarding stations and collectors, the new forms are fully described, and many critical remarks are included.—A. W. Evans.

6653. WOLFE, KATHARINE A. A list of Nebraska mosses. Bryologist 27: 26-31. 1924.—This is an annotated list of 76 species or varieties, giving habitat and locality. The author briefly reviews the previous literature, states that the material of previous lists has been re-identified, and outlines the ranges of the vegetational types present in the state.—E. B. Chamberlain.

MORPHOLOGY AND BAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See in this issue Entries 6650, 6666, 6670, 6674, 6677, 6678, 6764, 6786, 6813)

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

6654. BARBOUR, GEO. B. Cretaceous beds in North China. Nature 113: 194-195. 1924.—This is a brief preliminary report of recent investigations and tentatively records *Onchiopsis manteli* Brongn. and *Sphenopteris göpperti* Dunker.—O. A. Stevens.

6655. BERRY, EDWARD W. Mesozoic plants from Patagonia. Amer. Jour. Sci. 7: 473-482. Fig. 4. 1924.—This article describes *Nilsonia clarki* n. sp. from the Cretaceous, and *Ptilophyllum patagonicum* n. sp., *Araucaria* sp., and *Elatocladus palissayafolia* n. sp. from the Rhaetic of Patagonia.—E. W. Berry.

6656. GROVES, JAMES. *Clavator* Reid & Groves. Amer. Jour. Bot. 11: 116-117. 1924.—This is a note giving the specific name *Reidii* to the type of the genus *Clavator* proposed in 1916 as an extinct genus of Charophyta without naming the species on which it was founded. The material was from the late Jurassic (Purbeck) of England.—E. W. Berry.

6657. HOLLICK, ARTHUR, AND EDWARD W. BERRY. A late Tertiary flora from Bahia, Brazil. Johns Hopkins Univ. Studies Geol. No. 5. 135 p., 13 pl. 1924.—The authors describe various collections made from the state of Bahia. The systematic account is preceded by a sketch of the geology of the region, a short account of present physical conditions, and chapters on the composition, ecological conditions, and age of the fossil flora. Fifty-seven new species are described and figured. These include 1 fern and 56 dicotyledons, and represent many genera not common in fossil floras of higher latitudes. Genera not previously reported as fossils are *Hemitelia*, *Rollinia*, *Leptolobum*, *Trichilia*, *Spondias*, *Canella*, *Kielmeyera*, *Rheedia*, *Couroupita* and *Huberia*. The most closely related living species are also figured. The age is shown to be Pliocene.—E. W. Berry.

6658. SEWARD, A. C. On a collection of fossil plants from southeast Nigeria. Geol. Surv. Nigeria Bull. 6: 66-81. Pl. 1, fig. 1-2. 1924.—The following plants from continental beds lying conformably upon marine Cretaceous and below the coal measures are recorded: *Acrostichites* sp., *Salvinia formosa* Heer, *Typhacites latissimus* Al. Br. and a disk-like form that

may represent the fruit of the genus *Paliurus*. These were collected from a locality known as Enugu, and are considered as very probably Eocene in age.—*E. W. Berry*.

6659. SZAFER, WLADYSTAW. Trzeciorzędowe rośliny górskie na wale scytyjskim w ostoi podojsko-wolyńskie. [Tertiary plants inhabiting the Scythian range in Podolia and Volhynia.] Acta Soc. Bot. Poloniae 1: 97-119. 1923.—From the localized distribution and endemism of plants in the Scythian range, the author concludes that the flora of the range is pre-Pliocene, some plants being widespread in Eurasia while others are strictly Asiatic or European in their origin.—*C. W. Dodge*.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH AND HARRY BRAUN, *Associate Editors*

(See also in this issue Entries 6347, 6364, 6380, 6389, 6392, 6393, 6397, 6403, 6409, 6411, 6469, 6503, 6511, 6517, 6525, 6538, 6578, 6582, 6607, 6608, 6742, 6801, 6815, 6816, 6833, 6835, 6843)

DISEASES CAUSED BY FUNGI

6660. ANONYMOUS. Bestrijding van den Amerikaanschen Kruisbessenmeeldauw. [Control of powdery mildew on American goose-berry.] Tijdschr. Plantenz. 29: 133-135. 1923.—Alkaline Burgundy mixture (1½ kgm. copper sulphate, 1½ kgm. water free sodium carbonate for each 100 l. water) applied before the appearance of gooseberry powdery mildew during the first half of May gives satisfactory control.—*D. Atanasoff*.

6661. ANONYMOUS. Simple method of eradicating smut. Operative Miller 25: 79-80. 1920.—This is an historical summary of the development of a community plant for treating seed wheat to prevent loss from loose smut [*Ustilago Triticci*], devised by Russell G. East, County Agent of Shelby County, Indiana, in cooperation with Purdue University Agricultural Experiment Station and the U. S. Department of Agriculture.—*C. R. Ball*.

6662. ANDERSON, P. J. Botrytis cinerea in Alaska. Phytopathology 14: 152-155. Pl. 3. 1924.—The cool damp summers of southeastern Alaska are especially favorable for the development of *Botrytis cinerea* Pers. It has been collected on more than 100 species and is responsible for ¾ of the loss from plant diseases in this territory.—*B. B. Higgins*.

6663. BEWLEY, W. F. "Sleepy disease" of the tomato. Ann. Appl. Biol. 9: 116-134. 3 pl. 1922.—Sleepy disease or wilt of tomato in England was attributed originally by Massee to *Fusarium lycopersici*. It is pointed out, however, that two distinct fungi, namely, *F. lycopersici* and *Verticillium albo-atrum*, cause the disease. The latter is most widely distributed and destructive in England, Scotland, and the Channel Islands, where *F. lycopersici* is comparatively unimportant. Inoculations were made with both pathogenes. *Verticillium* enters the roots and grows up through the stem. Wounds are not required. Tomato plants were inoculated also with *F. oxysporum* which destroyed the pith, sometimes drying the lower leaves, but did not cause wilt. *F. lycopersici* grows best at an average temperature of 27.8°-28.9°C. Little infection results if the temperature is kept lower. *V. albo-atrum* develops well at 15.6°-24°C. but seems to be most active at 22.1°-22.8°C. Very little infection occurs at temperatures higher than 25°C. The relatively low temperature of glass houses in England is said to explain the prevalence of this pathogene. If the temperature is raised above 25°C., wilted plants may recover temporarily. *V. albo-atrum* causes wilt of potato, egg plant, snapdragon, cotton, pepper plants, cucumbers, and sweet peas. Several strains have been isolated. They vary in rate of growth, in amount and rate of production of microsclerotia and in chromogenesis, but there seems to be no evidence that different strains are restricted to different varieties of tomato. The pathogene produces many kinds of enzymes in pure cultures, and there is evidence that toxic substances, indirectly or directly, may produce the wilt. Less succulent varieties and unthrifty plants seem to be most susceptible to attack. Most varieties of tomato grown in England are susceptible to *Verticillium*, but Manx Marvel is practically immune and Bides' Recruit highly resistant. Regulation of temperature and other cultural devices may assist in reducing losses from the disease.—*E. C. Stakman*.

6664. CAYLEY, DOROTHY M. Fungi associated with "die back" in stone fruit trees I. Ann. Appl. Biol. 10: 253-275. Pl. 11-14. 1924.—Chief attention is given to a new species of *Diaporthe* as a cause of "die back" of stone fruits in England, although *Cytospora* and *Eutypella* are also dealt with. *Diaporthe perniciosa* Marchal, isolated by Marchal from stored fruit rots, was the most prevalent fungus met with on stone fruits affected with "die back." It proved to be parasitic and one of the causes of "die back." Strains of *D. perniciosa* from peach and plum were morphologically identical and caused "die back" on peach, plum, apricot, and nectarine. A strain from apricot showed morphological differences and caused "die back" on peach and apricot. Symptoms caused by *D. perniciosa* may not appear for a considerable time, in some cases years after infection occurs. The mycelium invades especially the medullary rays, cortical tissues, phloem, cambium and vessels. The imperfect stage is a *Phomopsis* having both "a" and "b" spores. The perithecial or *Valsa* stage develops numerous asci, each containing 8 2-celled ascospores. Perithecia are found on dead parts, whereas pycnidia occur on the living or partly moribund bark. External and internal symptoms of the disease are described. The fungus shows some polymorphism on the host but this is more pronounced on artificial media. Few perithecia develop in cultures from pycnosporous. Perithecia develop abundantly, however, on various media in cultures from single ascospores. Such cultures produce the pycnidial stage very sparingly and no "b" spores have been observed. Cultures of mass infections of ascospores have given the *Phomopsis* stage in some cases both with "a" and "b" spores, while in others no "b" spores have been found.—A. W. Henry.

6665. CHÉPIN, C. Les rouilles du blé en 1923 à Grignon. [Wheat rust at Grignon in 1923.] Rev. Path. Vég. et Entomol. Agric. 10: 318-323. 1923.—The paper deals with the time of appearance and importance of *Puccinia glumarum*, *P. triticea*, and *P. graminis*; and with the resistance and susceptibility of different varieties of wheat to *P. glumarum*.—Lillian C. Cash.

6666. GERRY, ELOISE. Five molds and their penetration into wood. Jour. Agric. Res. 26: 219-230. 4 pl. 1923.—Pure cultures of 5 so-called molds—*Aspergillus niger*, *Ceratostomella* sp., *Monilia sitophila*, *Penicillium divaricatum*, and an unidentified form—after growing in flasks for 2 years were found to have developed mycelium in the wood below the surface of the $\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{2}$ inch test blocks of aspen, Sitka spruce, red oak, and white oak. The mycelium was present in the center of the hardwood blocks. Penetration was chiefly through the natural openings—vessel or tracheid cavities—in the case of *Aspergillus niger* and *Ceratostomella* sp.—*Monilia sitophila* and *Penicillium divaricatum* showed the greatest amount of development in the different wood elements and a marked tendency to traverse cell walls. The unidentified mold was also found to have entered the wood fibers and parenchyma as well as the open vessels and resin passages.—Good differential staining was obtained with water solutions of gold chlorid and also of silver nitrate, the latter being less satisfactory.—The facts that certain molds may destroy cell-wall substance and that many produce a surface discoloration make it desirable to prevent the occurrence of mold in material to be subjected to especially exacting uses.—Author.

6667. GLASGOW, HUGH, AND W. O. GLOYER. Mercuric chloride as a preventive of certain damping-off fungi. Science 59: 338. 1924.—Two or 3 applications of mercuric chloride, diluted 1-1200, protect cabbage from *Rhizoctonia* and *Plasmodiophora* and are being tried out on other crops and soil-infesting fungi.—C. J. Lyon.

6668. KULKARNI, G. S. The smut of Nachani or Ragi (*Eleusine coracana* Gaertn.). Ann. Appl. Biol. 9: 184-186. 2 fig. 1922.—*Ustilago Eleusinis* causes a smut of *Eleusine coracana* Gaertn. Only a few grains in a head are infected. The spores adhere to the seeds and produce sporidia on germination. The disease is probably amenable to copper sulphate treatment.—E. C. Stakman.

6669. MUNCIE, J. H. Tomato leaf spot and experiments with its control. Pennsylvania Agric. Exp. Sta. Bull. 117. 1-23. 1922.—This is a study of leaf spot (*Septoria Lycopersici* Speg.) of tomato in Erie County, Pennsylvania, where severe infection has occurred annually for a period of several years. The work extended over the 3 year period from 1919 to 1921 and covers studies on the spread of the disease in the field, means of dissemination, spraying for control of the disease, relative efficiency of spray mixtures used, and effect of spraying upon

ripening of fruits. The disease appears in the field about July 1; by August 15 practically every plant is infected. The fungus is spread chiefly through splashing of spores by rain, and by spores carried upon the pickers hands. Insect carriers are of no great importance in this locality. Leaf spot is greatly reduced by spraying with Bordeaux mixture (8-8-100), Bordeaux soaps (8-4-6-100 or 8-8-6-100), and copper soap (1-0-6-100). The best control was secured with Bordeaux soap (8-8-6-100). While spray mixtures increased the total fruit yield they did not increase the yield of ripened fruit. The season is too short in Erie County to allow all the fruit on sprayed plants to ripen.—C. R. Orton.

6670. NEEDHAM, GEORGE H., AND CARL R. FELLERS. Use of the binocular microscope for mold and yeast counts. Science 59: 341-342. 1924.—Eye strain is reduced and mold filaments are more easily distinguished than with a monocular microscope. Daylight is best for mold counts but artificial light is recommended for yeast and spore counts.—C. J. Lyon.

6671. PETRESCU, C. Contribution a l'étude biologique de la flore de Dobrogea et de Moldavie. [Biological study of the flora of Dobrogea and Moldavia.] Compt. Rend. Soc. Biol. 90: 158-160. 1924.—Biological associations in which equilibrium has been attained and where both host and parasite develop reproductive bodies capable of germinating are noted in the following cases: *Uromyces ononidis* Pass. and *Ononis campestre* K. and Kiz.; *Uromyces silene ponticae* Const. and *Silene pontica* Brandza; *Puccinia stachydis* and *Stachys patula*; *P. elymicola* Const. and *Elymus sabulosus*; and *P. graminis* and *Triticum vulgare*, *Agropyrum glaucum*, *A. caninum*, *Avena sativa*, *Secale cereale*, and *Dactylis glomerata*. [See also following entry.]—Oran Raber.

6672. PETRESCU, C. Contribution a l'étude biologique de la flore de Moldavie. [Biological study of the flora of Moldavia.] Compt. Rend. Soc. Biol. 90: 320-322. 1924.—Attention is called to the biological associations in the following cases: *Uromyces trifolii-repensis* Liro and *Trifolium repens* L.; *U. trifolii* Lev. and *Trifolium ochroleucum* L., *T. pratense* L., and *T. panonicum* Jacq.; *U. minor* Schroet. and *Trifolium montanum* L.; and *U. striatus* Schroet. and *Medicago falcata* L., *M. media* L., *Trifolium aureum* Poll., *T. campestre* Schreb., *T. filiforme* L. and *T. arvense* L. [See also preceding entry.]—Oran Raber.

6673. POVAH, ALFRED. Hypoxylon poplar canker. Phytopathology 14: 140-145. 1 fig. 1924.—*Hypoxylon pruinaum* (Klotsche) Cke. was found attacking young poplar trees (*Populus tremuloides*, *P. grandidentata*, and *P. balsamifera*), producing a trunk canker with final girdling and death. No cankers were found on trees more than 6 inches in diameter.—B. B. Higgins.

6674. PRITCHARD, FRED J., AND W. S. PORTE. The relation of temperature and humidity to tomato leaf spot (*Septoria Lycopersici* Speg.). Phytopathology 14: 156-169. Pl. 4, 9 fig. 1924.—As determined by flask cultures, the minimum, optimum, and maximum temperatures for growth of the fungus are 42.8°, 77°, and 94°F. respectively. The minimum, optimum, and maximum temperatures for sporulation are 59°, 77°, and 80.5°F. respectively. These temperature relations, when correlated with climatological data for the United States, indicate that the freedom of the Pacific Coast and the comparative freedom of the northern states from injury by the disease is due to low temperatures which are unfavorable to rapid sporulation of the fungus, while in the Gulf Coast and extreme southern states high temperatures inhibit spore production. Loss is most severe in the Middle Atlantic states where moderate temperatures and high humidity favor rapid spread of the disease.—B. B. Higgins.

6675. RHOADS, ARTHUR S. Anthracnose of blackberries and raspberries: its cause and control. Ozark Fruit Grower 9: 3-5. 1 fig. 1924.—This is a discussion of the importance of anthracnose (*Plectodiscella veneta*) as a bramble disease in Missouri and of the susceptibility and resistance of the commonly cultivated varieties, followed by a detailed description of the development of the causal fungus, its effect upon the plants, and the method of dissemination. Control measures are discussed from the standpoint of both cultural methods and spraying.—Author.

6676. SALMON, E. S. On forms of the hop (*Humulus lupulus* L.) resistant to mildew (*Sphaerotheca humuli* (DC.) Burr.); V. Ann. Appl. Biol. 8: 146-163. 1921.—A summary is given of results obtained from 1914-1920 inclusive on several forms of wild hop (*Humulus lupulus* L.). Detailed analyses were made of the reactions of several forms to *S. humuli*. Variation

among the different forms was observed from complete susceptibility to immunity in the greenhouse, and high resistance in the field. Of the forms tested, 6.19% were commercially resistant in the field. The reaction to powdery mildew is said to be a constant character, as is indicated by the fact that the forms of hop were grown for 5 years in a manured hop garden with no change in resistance observable.—*E. C. Stakman*.

6677. SCHNEIDERHAN, F. J., AND F. D. FROMME. Apple scab and its control in Virginia. Virginia Agric. Exp. Sta. Bull. 236. 1-29. 6 fig. 1924.—Discharge of ascospores of the scab fungus (*Venturia inaequalis*) occurred on 16 separate days in Winchester, Va., in 1922, and on 13 separate days in 1923. The discharge period of 1922 covered a total of 56 days (April 18-June 12) and that of 1923 a total of 94 days (April 28-July 30). Six ascospore discharges occurred prior to the fall of petals in 1922 and only 1 during the same period in 1923. Seasonal conditions were favorable for scab development and infection in 1922 and 98.4 was the maximum percentage of scabby fruit recorded; conditions in 1923 were unfavorable, the comparable percentage of scabby fruit being only 7.6. Satisfactory control of scab was obtained with standard spray materials (lime-sulfur and Bordeaux mixture). The most valuable applications in scab control were at the pink, calyx, and 2-weeks stages. The calculated value of the pink spray was 50%, that of the calyx spray 25%, and that of the 2-weeks spray 15%. The delayed dormant and 5-weeks applications were of only slight value and the 10-weeks and August sprays were of no value in scab control. A survey of cull apples showed that a high percentage were caused by diseases and insects that are preventable by spraying; the rather general failure to secure adequate control is assigned to an insufficient number of sprays, to improper timing, and to a lack of thoroughness in the covering of foliage and fruit.—*F. D. Fromme*.

6678. SHEAR, C. L. Grape rust in Florida. Phytopathology 14: 170-171. 1924.—Grape rust (*Phytophthora Vitis* (Thüm.) Arthur) has been found generally distributed and sometimes very destructive throughout South Central Florida. A few commercial varieties, including Carmen, appear to be comparatively resistant.—*B. B. Higgins*.

6679. STAKMAN, E. C. Health protection for wheat. Baking Technology 2: 54-57. 1923.—The first law requiring barberry eradication was passed in France about 1660. The sentiment for protecting wheat fields has been growing rapidly on both continents since science showed the true cause of rust. Many of the more important grain growing districts in Europe have been cleared of barberry bushes. In the United States the campaign to eradicate the common barberry was begun in 13 or the north central states in 1918. Each of these states has legal provision for eradication. About 7 million bushes have been found since the campaign began and most of them have been destroyed. Rapid action is necessary because birds are scattering the seeds widely and escaped bushes are appearing in large numbers.—*Carleton R. Ball*.

6680. TISDALE, W. H., G. H. DUGAN, AND C. E. LEIGHTY. Flag smut of wheat, with special reference to varietal resistance. Illinois Agric. Exp. Sta. Bull. 242. 509-538. Illus. 1923.—The history, distribution, symptoms, and methods of dissemination of flag smut of wheat in the U. S. A. are given and the results presented of experimental work for its control. Seed treatment with copper sulphate and lime or with copper carbonate controls the disease if the spores are carried on the seed but not if the spores are present in the soil. Crop rotation and sanitary measures help to reduce the amount of infection. Planting late enough in the fall to escape infection reduces the yield to such an extent as to make this method impractical. The ultimate solution will probably be the use of resistant varieties. A complete list of tested resistant and susceptible varieties of wheat is given.—*Charlotte Elliott*.

6681. WILTSHIRE, S. P. Studies on the apple canker fungus. I. Leaf scar infection. Ann. Appl. Biol. 8: 182-192. 2 fig. 1 pl. 1921.—The author studied the methods of infection of apple trees by *Nectria ditissima* in order to determine whether control measures could be devised. The pathogene is said to enter the host almost entirely through small cracks which appear in leaf scar tissues immediately after defoliation in the fall and in the spring when the buds are swelling. It is, therefore, a wound parasite, if leaf scars can be considered as wounds. Those varieties which retain the leaves long appear to be most resistant, although the difference may not be significant. Excessive rain seems to be conducive to infection. Weakening

of the trees by aphids also seems to predispose them to attack. There is some correlation between varieties susceptible to canker and those susceptible to scab. Infection often occurred only on the side of the trees exposed to the wind. It is suggested that lowering of temperature may be conducive to infection by delaying the formation of phellogen. Microscopic details of infection are given. The disease cannot be prevented entirely by fall spraying. At least 2 sprayings at the time of defoliation would be necessary to control the disease because infection occurs so rapidly. Copper fungicides spot the fruit and the pathogene seems to be somewhat resistant to sulphur. The author observes that any treatment which increases the vigor of the trees would be likely to reduce the amount of infection.—*E. C. Stakman*.

DISEASES CAUSED BY BACTERIA

6682. ANDERSON, P. J. Overwintering of tobacco wildfire bacteria in New England. *Phytopathology* 14: 132-139. 1924.—Experiments herein reported show that the tobacco wildfire organism (*Bacterium tabacum* Wolf & Foster.) is not killed, nor is its virulence destroyed by such alternate freezing and thawing as occurs in Massachusetts during a severely cold winter. The bacteria remain alive and virulent in diseased leaves (in sheds or hanging in the fields), on boards, on sash, in dry fragments of diseased pods, and in pure cultures in soil. Apparently they do not survive in soil not sterilized or in any situation where conditions favor the development of competing organisms. The results further indicate that under Massachusetts conditions seed are a very minor source of primary infection; seed disinfection is not necessary if seed are saved from healthy plants. A list of precautionary measures for prevention of primary infection is given.—*B. B. Higgins*.

6683. LACEY, MARGARET S. Studies in bacteriosis. VI. *Bacillus carotovorus* as the cause of soft-rot in cultivated violets. *Ann. Appl. Biol.* 9: 169-170. 1922.—The writer concludes that *B. carotovorus* causes stem and petiole rot of violets. The organism isolated from violets also rotted carrots, turnips, potatoes and onions. This strain was compared with one obtained from L. R. Jones. The rods of the violet strain were longer but otherwise the 2 were identical.—*E. C. Stakman*.

6684. MILLARD, W. A. Common scab of potatoes. *Ann. Appl. Biol.* 9: 156-164. 2 pl. 1922.—The theory that potato scab was caused by mechanical injury was long held in England. The writer, however, made inoculations which confirmed Thaxter's original conclusions. Of 7 strains of *Actinomyces* tested, 5 were pathogenic. Failure of the other 2 to infect may have been due to the fact that early maturing varieties of potatoes were used. Indications are that strains of *Actinomyces* are not specific to certain varieties of potatoes. The writer concludes that common scab is caused by various members of the genus *Actinomyces* which may differ considerably from each other culturally.—*E. C. Stakman*.

6685. PAINE, SYDNEY G., AND MARGARET S. LACEY. Studies in bacteriosis. VII. Comparison of the "stripe disease" with the "Grand Rapids disease" of tomato. *Ann. Appl. Biol.* 9: 210-212. 1922.—The writers conclude that stripe disease of tomatoes in England is not the same as "Grand Rapids disease" in the United States. The former is caused by *Bacillus Lathyri* and the latter by *Aplanobacter Michiganense*. *A. dissimulans*, recently described by Paine and Bewley, resembles *A. Michiganense* in many respects but is not pathogenic to tomato.—*E. C. Stakman*.

6686. PAINE, SYDNEY G., AND MARGARET S. LACEY. Studies in bacteriosis. IX. Streak disease of broad beans. *Ann. Appl. Biol.* 10: 194-203. Pl. 8-10. 1923.—A bacterial disease of broad beans, characterized by chocolate colored spots on the leaves, broad sunken streaks with a bronze luster on the stems and similar colored patches on the pods, occurs in England and Wales. It is seriously destructive only when abundant moisture and high temperature prevail, as in 1902. The total loss in southern England in 1920 was estimated at 40-50%. *Bacillus Lathyri*, the organism which also causes streak disease of tomato and of sweet peas and other legumes, was isolated from the bean lesions, and shown by controlled inoculation experiments to be the cause of this disease. Restriction of the disease to small areas on stems and leaves is attributed to destruction of the organism by desiccation of the diseased tissue. It is considered that the disease is spread by infected seed, especially through seed bored into by beetles. Observations indicated that it is also disseminated by the wind, aphids, and black

flies. Rejection of seed showing an excessive amount of beetle injury, seed sterilization with weak lysol or formalin, applications of potash to infected soils, and spraying to destroy the black fly are suggested control measures.—A. W. Henry.

6687. PAINE, SYDNEY G., AND MARGARET S. LACEY. *Studies in bacteriosis. X. The use of serum-agglutination in the diagnosis of plant parasites.* Ann. Appl. Biol. 10: 204-209. 1923.—Serum agglutination tests were used in determining possible relationships between *Bacillus Lathyræ* and certain yellow organisms also isolated from plant tissues infected with that organism. One of these gave all the reactions of *Pseudomonas Phaseoli*. Comparisons were also made with *Aplanobacter Michiganense* and *A. dissimulans*. Sera were prepared by inoculating rabbits with emulsions, in normal saline solutions, of *B. Lathyræ*, *Ps. Phaseoli*, and *A. Michiganense*. All strains of *B. Lathyræ* exhibited marked agglutination with the *B. Lathyræ* serum although the agglutinating power was different for different strains. All strains but one of *B. Lathyræ* were agglutinated with the serum of *Ps. Phaseoli*. It is suggested that one species may have arisen in the tissues of the plant as a mutant from the other and that non-virulent strains of the same species may be mutants of the virulent one. The *Aplanobacters* showed no agglutination with either the *B. Lathyræ* serum or the *Ps. Phaseoli* serum and were otherwise quite distinct in their physiological behavior.—A. W. Henry.

6688. STEWART, F. C. *Recommendations for the improvement of official inspection for crown-gall.* Phytopathology 14: 172-173. 1924.—This includes the report of a committee composed of representatives from several organizations interested in nursery inspection.—B. B. Higgins.

6689. VALLEAU, W. D. *The infection of tobacco plant beds by spitting.* Science 59: 337-338. 1924.—The bacterial leaf-spot diseases, *Bacterium angulatum* Fromme and *B. tabacum* Wolf and Moss, have been spreading rapidly in spite of methods of seed treatment and spraying. Evidence is here offered that the chief method of spread is by the man who chews the natural leaf of the year before or other tobacco, and who spits into the beds he is weeding. Little or no disease appears where the worker does not use tobacco in this form.—C. J. Lyon.

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

6690. HOLMES, FRANCIS O. *Herpetomonad flagellates in the latex of milkweed in Maryland.* Phytopathology 14: 146-151. 10 fig. 1924.—A flagellate, apparently identical with *Leptomonas (Herpetomonas) Elbaassiani* Migone, was found infesting the latex of a milkweed (probably *Asclepias syriaca*) near Baltimore, Maryland, late in the summer of 1923. Further study is planned to determine the effect upon the host and the method of transmission from plant to plant.—B. B. Higgins.

6691. HORSEFALL, J. L. *The effects of feeding punctures of aphids on certain plant tissues.* Pennsylvania Agric. Exp. Sta. Bull. 182. 1-22. 7 pl. 1923.—The investigation is concerned with the effects produced by *Aphis rumicis* L. on *Tropaeolum minus*, *Rumex crispus*, *Chenopodium album*, and *Amaranthus retroflexus*; by *Mysus persicae* Sulz. on *Freesia refracta* and *Digitalis purpurea*; by *Macrosiphum rudbeckiae* Fitch on *Solidago* sp., and by *Macrosiphum ambrosiae* Thomas on *Bidens* sp. Successful fixation was accomplished by transferring the infested portion of the host to a bell jar in which the atmosphere was saturated with ether. As soon as the aphids were quiescent the tissue was cut and dropped, with the adhering aphids, into Petrunkevitch's solution. A majority of the slides were stained with Flemming's triple stain although several other stains were used to bring out particular structures.—The following conclusions were reached: (1) The path of the setal proboscis, as a rule, follows the middle lamella or is intercellular. (2) The route followed by the proboscis is more or less sinuous and the various branches of the path indicate the trial and error method of reaching the bundle. (3) The objective of the beak is always a vascular bundle. (4) Within the bundle the tissue which is most commonly reached is the phloem, particularly the sieve tubes. These sieve tubes may even become filled with sheath material from beaks which have pierced them and followed their course inside the tubes. In a few cases the setae pierced the tracheal tubes. Broken-down phloem tissue was most common in *Digitalis purpurea*. (5) Pierced epidermal and parenchyma cells may remain distended with the normal turgor or may collapse partially or wholly. (6) Collapsed cells, contiguous to the setae but not actually pierced by them, are

common in both cortical and bundle parenchyma in petioles of *Rumex crispus*. (7) There is a tendency for the nuclei of living cells adjacent to the path to be located on the side toward the piercing setae. This condition exists in cells other than those immediately touched by the beak. (8) The setal proboscis is surrounded by a sheath of calcium pectate and proteid material. The calcium pectate is evidently laid down by the plant cells while the proteid matter may possibly be injected by the aphid.—*C. R. Orton*.

6692. MÜLLER, H. C., UND E. MOLZ. Weitere Versuche zur Bekämpfung der Rübennekmatoden (*Heterodera Schachtii* A. Schmidt) mittels des abgeänderten Fangpflanzenverfahrens. [Further experiments on control of beet nematodes by modified catch plant methods.] Landw. Jahrb. 54: 747-768. 1920.—Instead of using the costly and time-consuming method of plowing under catch crops for nematode control it is found that a satisfactory result may be attained by application of a 30% solution of iron sulphate, or by other weed control methods.—In the crop rotation it is practicable to sow the first catch crop in the preceding grain crop. Two catch crop sowings then follow the harvesting of the main crop.—The experimental results of the action of this new iron sulphate method show that after the death of the aerial plant parts there is still some development within the remaining underground parts, but that the nematodes finally die.—A part of the nematodes in a plant wander out again after the death of the aerial parts. This disadvantage, however, is largely nullified by the fact that after the removal of this material from the field the nematodes still at large migrate into the roots.—The total number of nematodes migrating into the plants in a field is influenced only by the thickness of seeding, from which it follows that catch crops should be broadcasted rather than drilled in order to obtain as uniform and thick a stand as possible.—*Frederick V. Rand*.

6693. WELLS, B. W. Evolution of zoocecidia. Bot. Gaz. 71: 358-377. Pl. 21-22. 1921.—Küster's groups, kataplasmas (lower galls of indefinite nature, differentiation conditions similar to those of the normal plant but not as complex) and prosoplasma (higher galls of definite nature, with new differentiation conditions), are basic for the present paper.—Evolutionary concepts are introduced in pointing out the origin of prosoplasmas from kataplasmas. The probable main outlines (phylogenetic trees) of the natural cecidozoon gall groups are presented for the first time.—Kataplastic evolution is held to be a process of progressive inhibition of differentiation ending with tissue homogeneity. Prosoplastic evolution may begin only when homogeneity has been attained, and consists chiefly in the development of new form and tissue orientation characters. In prosoplasma formation, whether viewed ontogenetically or phylogenetically, the insect larva has gained control of the mechanisms of differentiation and morphogenesis, so that animal factors come to expression in plant tissue. It thus appears that the larval insect must first reduce any differentiation which has been attained, throwing the cells near it into a meristematic or embryonic state after which, in the case of prosoplasmas, a new type of differentiation may ensue.—It is held that the evolutionary origin of significant characters of prosoplasmas (higher galls) lies in a change in factorial situation in animal germ plasm.—*B. W. Wells*.

INFECTIOUS CHLOROSES (MOSIAC AND PEACH YELLOW GROUPS. ETC.)

6694. CLEVERINGA, O. J. Verschillende belangrijke punten voor het pootgoedvraagstuk bij aardappelen, in het bijzonder ook de rol die de afdeelingen (der landbouwmaatschappijen) daarbij kunnen vervullen. [The seed potato problem.] Tijdschr. Plantenz. 30: 17-26. 1924.—When certified seed potatoes are used the yield is good the first year, but decreases rapidly during the years following. The reason for this is the accumulation of degeneration diseases such as leaf roll, mosaic, etc. These may be controlled by prompt removal of infected vines, by selecting seed potatoes only from the best and most vigorous plants and by early digging of seed potatoes to avoid infection.—*D. Atanasoff*.

6695. ESMARCH, F. Die Phloëmnekrose der Kartoffel. [Phloem necrosis in the Irish potato.] Ber. Deutsch. Bot. Ges. 37: 463-470. 1919.—Necrosis of the phloem is found in both normal and diseased plants and is always present in mature organs; if necrosis is observed during the early life of the plant, it is an indication of premature ripening. Phloem necrosis cannot be considered a specific symptom of leafroll and has no diagnostic value.—*Ernst Artschwager*.

6696. OORTWIJN BOTJES, J. Het vroeg rooien van voor pootgoed bestemde aardappelen. [Early digging of seed potatoes.] Tijdschr. Plantenz. 29: 132-133. 1923. [Also in Verslag. en Mededeel. Plantenziektenk. Dienst Wageningen 32. 1-11. 1923.]—The author recommends that potatoes intended for seed should be dug before the appearance of insects in large numbers—carriers of degeneration diseases, such as leaf-roll, mosaic, crinkle, etc.—and before infection from the plants has reached the tubers. This will give a higher percentage of disease-free seed.—*D. Atanasoff*.

PARASITIC PHANEROGAMS

6697. HERBERT, D. A. Phanaerogamic root parasites. Philippine Agric. 12: 221-223. 1923.

6698. LILPOP, J. Luskiewnik (*Lathraea squamaria* L.) na świerku w Tatrach. [Lathraea squamaria as a parasite of fir trees in the Tatra.] Acta Soc. Bot. Poloniae 1: 60-61. 1923.—The author reports *Lathraea squamaria* L. on *Picea excelsa* in the Tatra Mtns. at 900-1200 m. elevation.—*C. W. Dodge*

6699. SANDS, W. N. Mistletoes attacking cultivated trees in Malaya. Malayan Agric. Jour. 12: 64-76. 3 pl. 1924.—Mistletoes are common and often serious pests of cultivated fruit and other trees in Malaya. Descriptions of the 5 most important species are given—*Loranthus ferrugineus*, *L. pentandrus*, *L. grandifrons*, *L. pentapetalus* and *Elytranthe globosa*—with a list of the names of trees on which each species has been found and a short account of the biology and life history of the parasites.—*R. E. Holttum*.

NON-PARASITIC DISEASES

6700. BRENCHELY, WINIFRED E., AND KHARAK SINGH. Effect of high root temperature and excessive insolation upon growth. Ann. Appl. Biol. 9: 197-209. 2 fig. 1922.—The growth of peas is seriously hindered by overcrowding under ordinary conditions of light and temperature, even when each plant receives a similar supply of food and water. In hot, sunny weather, however, crowding up to a certain point may favor growth by lowering the temperature at the roots of the plants and by partially shading them. Too much crowding, however, depresses growth. If insolation is not excessive, the amount of daily fluctuation of root temperature within a range of 22°C. (6.7°-28.9°C.) affects growth but little. It makes little difference whether the maxima are high and the minima low, or the maxima low and the minima high, provided the respective means are not too different. When root temperatures are high, a slight decrease in insolation may promote better growth.—*E. C. Stakman*.

6701. HEIDEMA, J. Beschadiging van vlas door hitte en nachtvorst. [Heat and night frost injury of flax.] Tijdschr. Plantenz. 29: 129-132. 1923.—Heat causes death of the plant as a whole, whereas frost injures only the tops which wilt and die. Good preparation and rolling of the soil will prevent frost injury to a large extent.—*D. Atanasoff*.

6702. PRIESTLEY, J. H. The toxic action of traces of coal gas upon plants. Ann. Appl. Biol. 9: 146-155. 1922.—One part of ethylene in ten million parts of air is toxic to the etiolated epicotyl of peas. The gas inhibits formation of a primary functional endodermis, possibly by preventing the normal accumulation of unsaturated acids near the future Casparian strip. The result is an increase in diameter because the nutrients go into the periphery of the roots and lower portion of the stem. It is suggested that the gases interfere with normal deposition of fatty acids in the cork cells, thus inhibiting the formation of cork. The writer points out that these observations furnish a basis for definite diagnosis of plants supposed to have been injured by gas.—*E. C. Stakman*.

6703. RIVIÈRE, G., ET G. PICHARD. La chlorose des arbres fruitiers. Son influence sur la composition chimique des fruits. [Chlorosis of fruit trees: its influence on the chemical composition of fruits.] Jour. Soc. Nation. Hort. France 23: 192-194. 1922.—This paper gives analyses of pears grown on trees which had suffered from chlorosis. One tree was treated with sulphate of iron and recovered, while an untreated tree was chlorotic throughout the season. Pears from the treated tree contained a larger quantity of total sugar and a much larger amount of ash and iron than pears from the untreated chlorotic tree. The author states that the foliage on the treated tree returned to a normal green color and functioned normally.—*H. C. Thompson*.

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE.

6704. ANONYMOUS. *Sproeien en sproeiers*. [Sprays and spraying equipment.] Verslag. en Mededeel. Plantenziektenk. Dienst Wageningen 33. 1-31. 5 pl. 1924.—Sprays, spraying equipments, methods and time of spraying against plant diseases and injurious insects are treated in detail.—*D. Atanasoff*.

6705. AJARKAR, S. L., AND J. D. RANADIVE. The relative responsibility of physical heat and micro-organisms for the hot weather rotting of potatoes in Western India. *Agric. Res. Inst. (Pusa) Bull.* 148. 1-18. 3 pl. 1923.—Storage rots of potatoes have been under study at Poona and the results of part of the work done previous to 1920 have been published in Bombay Dept. Agric. Bull. 102.—The authors conclude that physical heat up to 42°C. acting on potato tubers for at least 9 days causes no rotting in the absence of micro-organisms. What is termed "black heart" by American pathologists is termed "heat rot" by the authors of this paper, and they contend that the identification of "black heart" and "heat rot" is incorrect. They argue that micro-organisms are primarily responsible in the causation of "heat rot," and believe that reduction of the temperature of storage to 90°F. cannot alone be relied upon to insure freedom from "heat rot."—*H. M. Jennison*.

6706. APPEL, O. *Der Pflanzenschutz im Unterricht*. [Teaching plant protection.] Rept. Internat. Conf. Phytopath. and Econom. Entomol. Holland. P. 226-231. H. Veenman & Sons: Wageningen, 1923.—With the increase in intensive cultivation the problems of plant protection become more and more serious. However the significance of plant diseases is wholly unknown to the great majority of farmers. It would be desirable to introduce the most important examples of plant protection into the lower schools, thereby stimulating interest and spreading actual knowledge of the principles. In all universities where agriculture is studied, adequate courses in plant protection should be given, with special emphasis on the new developments of the last decade. Through such a program it will be possible to develop a science, which, corresponding to human and veterinary medicine, will represent phyto-medicine. In actual practice, diseases will be correctly diagnosed and, at least in the case of the most prominent and common ones, treatment prescribed to cure or to prevent further spread.—*Lillian C. Cash*.

6707. ASHESHOV, IGOR N. Experimental studies on the bacteriophage. *Jour. Infect. Diseases* 34: 536-548. Pl. 1-2. 1924.—Studies were made with a bacteriophage against *B. dysenteriae* Flexner, strain 2, obtained from the feces of a healthy guinea-pig. The bacteriophage became very active when used with the organism, but when kept in the form of a filtrate or unfiltered lysate the bacteriophage lost its activity in from 3 to 5 months, and even after 2 months it was found to be considerably attenuated. During subsequent passages, the bacteriophage regained its normal character. A given strain consequently has a wide variation in activity. A bacteriophage may become adjusted to act under conditions which are normally unfavorable. Neither the number of bacteria nor the concentration of the bacteriophage, within certain limits, appreciably affects the activity of the bacteriophage. From the experiments reported, the author concludes that "the phenomenon cannot be explained logically other than by the presence of a living being."—*R. L. Starkey*.

6708. DURHAM, H. E. Disease resistance and a copper hypothesis. *Gard. Chron.* 73: 276. 1923.—Minute quantities of copper are found in a great variety of plants. The author suggests the possibility of attempting to determine whether resistant varieties of different plants have a higher copper content than susceptible ones.—*George M. Reed*.

6709. ERNST, ADOLFO. Estudios sobre las deformaciones, enfermedades y enemigos del arbol de cafe en Venezuela. Anotaciones de H. Pittier. [Studies on the malformations, enemies and diseases of coffee in Venezuela. (With notes by H. Pittier).] Boletin Camara Comercio Caracas 120. 1-31. 1923.—The Caracas Chamber of Commerce has reprinted this paper, originally written in 1877, in order to commemorate the author, and also to call attention to the importance of coffee growing in Venezuela. The bulletin enumerates various malformations, diseases due to cultural, soil and climatic conditions, and diseases due to plant and animal parasites. The disease known as "Candelillo," attributed by Ernst to an *Erysiphe*, but now supposed to be due to *Pellicularia koleroga* Cooke, is described in some detail; *Depazea maculosa* Berk. and *Strigula complanata* Mont. are briefly mentioned. The freedom

of coffee in Venezuela from serious fungous diseases, particularly from the rust *Hemileia vastatrix* B. & Br., is noted.—*Edith K. Cash.*

6710. FOËX, ET. Principales questions de pathologie végétale. [Principal problems of plant pathology.] Jour. Soc. Nation. Hort. France 23: 125-141. 1922.—This is a review of the work on diseases of potatoes, including *Phytophthora infestans*, *Synchytrium endobioticum* Percival, *Oospora scabies*, and degeneration diseases—leaf-roll, mosaic and others. The subject of degeneration of varieties is also discussed.—*H. C. Thompson.*

6711. FRYER, PERCIVAL J. Successful spraying and how to achieve it. A handbook for growers, nurserymen, horticulturists, gardeners and amateurs. 154 p., 81 fig. Ernest Benn Ltd.: London, 1923.—Spraying is discussed under the following chapter headings: How to ensure efficient spraying, spraying with an object, tactics of warfare against insect enemies, destroying the sap-feeders, controlling the leaf-eaters, hidden enemies, the question of water supply, the chemistry of spraying, subterranean pests, fungous diseases, insecticides and fungicides, up-to-date spraying, fumigation, description of insect and fungous pests.—*Frederick V. Rand.*

6712. GOULD, C. H. Observations on some of the newer spraying materials. Proc. Amer. Soc. Hort. Sci. 19: 35-37. 1922 [1923].—Analyses of 5 of the newer spraying materials together with results of tests made on Baldwin, McIntosh, and Wealthy apple trees are given. In general these new spray materials (Sulfurex, Sulco V. B., Nu Rex Spray Dried, Nu Rexo and Celeste) are not as reliable as the standard formulae of liquid lime sulphur and lead.—*W. E. Whitehouse.*

6713. HIMMELBAUER, WOLFGANG. Die Blattrollkrankheit der Kartoffel. [Potato leafroll.] Wiener Landw. Zeitg. 74: 43-44. 1924.—This is a review of a number of recent papers and a presentation of the status of "leafrolling diseases" of the potato. Among these diseases the author includes Fusarium and Verticillium wilt and conditions due to weather and culture, as well as the so-called non-parasitic disease—true leafroll. The latter has not become as widespread in the 20 years which have elapsed since its discovery as was at first feared.—*F. Weiss.*

6714. IGETA, ARATA. Supplement to the handbook of the plant diseases in Japan. [In Japanese] Vol. I. 398 p., illus. Shōkwabō: Tokyo, 1923.

6715. LEES, A. H. Leaf character in reverted black currants. Ann. Appl. Biol. 9: 49-68. 46 fig. 1922.—The reversion disease of black currants, often known as "nettle leaf," is characterized by the fact that the leaves become long and narrow like those of the stinging nettle; they become abnormally thick and dark in color, and serrations become fewer and coarser than in normal leaves. "Oak leaf" is said to be an advanced stage of reverted leaf and is always associated with mites. The reversion may be temporary or permanent. Three factors appear to be operative: a seasonal factor, a reversion factor, and attack by mites. Temporary reversion can be caused artificially. It is important to recognize the type of reversion, and the author therefore devised a method of determining it by counting the number of sub-main veins extending from the midrib to points on the margin of the leaf and by observation of the margin points. The entire method can be reduced to a numerical basis.—*E. C. Stakman.*

6716. MOTTET, M. S. La dégénérescence de la pomme de terre. [Degeneration of potatoes.] Jour. Soc. Nation. Hort. France 23: 263-268. 1 fig. 1922.—The author states that degeneration may be due to a number of causes: (1) influence of diseases, especially mosaic, leaf roll and other similar troubles, (2) imperfect adaptation of varieties to the environmental conditions, (3) impoverishment of the soil due to preceding crops, and (4) progressive impoverishment of the varieties themselves due to continued propagation by asexual methods. A discussion of these factors follows.—*H. C. Thompson.*

6717. PAERELS, J. J. Overzicht over de voornaamste ziekten en plagen van den Cacao-boom op Java. [Review of the most important diseases and enemies of cacao in Java.] Tijdschr. Plantenz. 30: 51-61. 1924.—The following physiological and fungous diseases are treated: Sunburn, tumors formed by the development of adventitious buds failing to reach the surface of the bark, which may be controlled by removal; blackening of excess fruits; attacks by *Loranthus* sp., *Corticium salmonicolor* B. et Br., *Diplodia cacaoicola* P. Henn., *Phytophthora Faberi* Maubl., *Stilbella nana* Masee, *Thyridaria* (Diplodia), *Nectria* (*Fusarium*), *Colletotrichum*, etc.—*D. Atanasoff.*

6718. POETEREN, N. VAN. **Verslag over de werkzaamheden van den Plantenziektenkundigen Dienst in het jaar 1922.** [Annual report of the Phytopathologic Service for 1922.] Verslag. en Mededeel. Plantenziektenk. Dienst. Wageningen 31. 1-59. 1923.—From this detailed report which discusses at length the various activities of the Dutch Phytopathologic Service only chapter IX, on "Investigations and Experiments," will be considered here. Soil sterilization experiments using carbolic acid and cresylic acid ($\frac{1}{2}$ l. in 20 l. water per sq. m.) in general gave no beneficial results against *Rhizoctonia*, *Verticillium* and nematodes. Ammonium carbonate and copper sulphate also gave negative results. Dichlorocresol completely controlled the soil nematodes. Ammonia gas, formalin, and ammonium carbonate had no effect upon soil nematodes. The most effective control measure against stinking smut of wheat and *Helminthosporium* stripe disease of barley has proved to be Germisan. Hot water treatment controlled smut of French rye-grass.—*D. Atanasoff*.

6719. RITZEMA BOS, J. **De pulverisateur "Ideal" van Louis Blanc te Lausanne.** [The pulverizer "Ideal" of Louis Blanc-Lausanne.] Tijdschr. Plantenz. 30: 26-29. 4 fig. 1924.—The advantages of this hand-spray for liquid fungicides are: (1) an especially good distribution of the spray, the plants being completely and uniformly covered; (2) great economy in the use of materials; (3) ease in covering the upper as well as the lower side of the leaves; and (4) the relatively slight exertion required to operate.—*Lillian C. Cash*.

6720. RHODES, ARTHUR S. **The use of spreaders in spray applications.** Ozark Fruit Grower 8¹²: 6-7. 1923.—This is a discussion of spreaders in general and of the relation of the calcium caseinate spreader to spray efficiency, its value in lessening spray injury, its stabilizing value in combination sprays, and its value in lessening blotchy spray coverings on mature fruit.—*Author*.

6721. RUMBOLD, CAROLINE. **Sugar-beet seed disinfection with formaldehyde vapor and steam.** Facts About Sugar 18: 322-324, 352-354. 6 fig. 1924.—Sugar beet seed balls are exposed for 20 minutes to a mixture of formaldehyde vapor and steam with a temperature of 140°F. (60°C.). This treatment quickly impregnates the outer tissues of the seed balls with formaldehyde without starting germination or injuring the viability of the seed. It is safe to hold the seed after treatment. Examination of treated seed showed that bacteria on the beet balls were killed more quickly than fungi; of the fungi, *Phoma betae* more quickly than *Alternaria* and *Fusarium*. Field tests in Colorado with treated seed showed increased sugar per acre.—*Author*.

6722. STOKDYK, E. A., AND L. E. MELCHERS. **Potato disease control in Kansas.** Kansas Agric. Exp. Sta. Bull. 231. 1-45. 16 fig. 1924.—The more important diseases are described and methods for control given. Five seasons' experimental results from spraying the potato crop with Bordeaux mixture show that large increases are not probable except during seasons of epidemics of early blight or tipburn. Bordeaux sprays applied in the absence of leaf diseases have not shown profitable returns. Copper dusts are being used in some experiments. Large increases in yield over a series of years have resulted from the use of the $1\frac{1}{2}$ hour corrosive sublimate treatment. In yield tests, certified and uncertified seed have shown increased yields in favor of the former.—*L. E. Melchers*.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

6723. HANSEN, ALBERT A. **A unique field experiment with white snakeroot.** Jour. Amer. Vet. Med. Assoc. 65: 224-226. 2 fig. 1924.—A description is given of the feeding of white snakeroot to a ewe, producing in this animal the disease known as "trembles."—*C. D. Marsh*.

6724. KIVISDA, WILHELM. **Der Anbau des Kümmels.** [Caraway culture.] Wiener Landw. Zeit. 74: 69-70. 1924.—Owing to lack of attention to garden cultivation of *Carum carvi* in Austria, the domestic supply is small and poor in quality, resulting in a high price for better seed from Germany. Culture of the plant and methods of harvesting and drying the seed are described, particularly relative to its use in the drug trade as a source of *oleum carvi*.—*F. Weiss*.

6725. SNELL, WALTER H. Hypersensitivity to the castor bean. *Science* 59: 300. 1924.—The author reports a case (cf. *Science* 58: 305-306. 1923) of castor beans producing violent symptoms of hay fever.—*C. J. Lyon.*

6726. STEINER, PIERRE. Étude spectrographique des alcaloides végétaux.—L'absorption des rayons ultra-violet par les alcaloides des classes de l'isoquinoléine et de la morphine. [Absorption of ultraviolet rays by alkaloids of the isoquinoline and morphine groups.] *Bull. Soc. Chim. Biol.* 6: 231-287. 7 fig. 1924.—The spectra of the fundamental aromatic nuclei benzene, naphthalene, pyridine and isoquinoline and of veratrol, vanillin, opianic acid, hemipinic acid, and meconin were studied and photographed as a basis for study of the isoquinolines: papaverine, hydrastine, hydrohydrastinine, hydrocotarnine, narcotine, narceine, berberine, cotarnine, hydrastinine; and of apomorphine, thebaine, morphine, codeine and heroin of the morphine group. Absorption spectra for each of these substances are diagrammatically represented. The possibilities of ultra-violet spectrography as a means of recognition and quantitative estimation of alkaloids are discussed. A bibliography of 51 titles accompanies the paper.—*Joseph S. Caldwell.*

6727. ZUNZ, EDGARD. Action de l'ergotamine sur la pupille chez le chat et chez le chien. [Action of ergotamine on the pupil of the eye in the cat and dog.] *Compt. Rend. Soc. Biol.* 90: 379-381. 1924.—Ergot contains two alkaloids, ergotoxine and ergotamine. Ergotamine causes a contraction of the pupil of the eye. The present paper deals with the various methods of administering the drug, the dosage, and the effects.—*Oran Raber.*

PHYSIOLOGY¹

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 6350, 6362, 6379, 6400, 6447, 6468, 6469, 6508, 6509, 6512, 6515, 6528, 6546, 6580, 6674, 6687, 6693, 6702, 6705, 6707, 6708, 6726, 6824, 6830, 6832, 6833, 6837)

DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL PHENOMENA

6728. ANONYMOUS. The transport of food substances in the plant. *Nature* 113: 168-169. 1924.—This is a review of recent work by H. H. Dixon, Otis F. Curtis, and [Paul A.] Murphy.—*O. A. Stevens.*

6729. COHN, E. J. A physico-chemical method of characterizing proteins. V. *Jour. Biol. Chem.* 59: Proc. iv. 1924.

6730. EFFRONT, JEAN. Absorption des ions H et OH par les pulpes végétales. [Absorption of H and OH ions by plant pulps.] *Compt. Rend. Soc. Biol.* 90: 103-106. 1924.—Plant pulps actively absorb acids, alkalis, and enzymes. The intensity of absorption varies with the species. Apples and pears have a rather feeble absorbing capacity when compared with carrots and cauliflowers.—The manner of preparing the pulp is also extremely important. Pulp prepared cold retains more water than that prepared with boiling water and absorbs less per gm. of dry pulp. [See also following entry.]—*Oran Raber.*

6731. EFFRONT, JEAN. Influence des pulpes végétales sur les réactions du tube digestif. [Influence of vegetable pulps on the reactions of the alimentary tract.] *Compt. Rend. Soc. Biol.* 90: 106-108. 1924.—Cooking profoundly changes the absorbing properties of pulps; the absorbing power of acids is increased and that of alkalis is diminished.—The absorbing power of carrot and prune pulp increases with the concentration of the substance absorbed. Pulps may hence serve as regulators of the reaction of a medium. [See also preceding entry.]—*Oran Raber.*

6732. LAPICQUE, L., ET T. KERGMARD. Acidification par l'asphyxie chez les *Spirogyres*; réactions morphologiques consécutives. [Acidification by asphyxiation in *Spirogyra*; consecutive morphological changes.] *Compt. Rend. Soc. Biol.* 88: 1081-1083. 1923.—When placed in the light the water in which *Spirogyra neglecta* or *S. nitida* is growing will reach an alka-

¹Due to temporary absence of the editors, responsibility for the section of physiology, this issue, rests with the associate editor in chief.

linity of pH 9.8 or 10. If it is grown continuously in the dark for 48-60 hours the solution has a pH of 5.6 or 5.4. In this acid condition the chromatophores are wound tightly about the nucleus. If placed suddenly in a strong light while in this condition, the chromatophores assume the appearance of a string of sausages and each fragment rounds up more or less, continuing until there is merely a series of droplets or (more rarely) the chromatophores swell up in various places, each swelling becoming a vacuole around which the substance of the chromatophore forms a very thin layer. These changes are attributed to sudden changes in the acidity of a gel and may furnish interesting information on the physico-chemical behavior of colloids.—*Oran Raber*.

6733. PRAT, SYLVESTER. Plasmolysis and permeability II. *Preslia* 2: 90-95. 4 fig. 1922 [1923].—G. Höfer's formula for calculating the osmotic pressure of plant cells is described as being useful for measurement of osmotic pressure in cylindrical cells only. The author has modified Höfer's method so that it becomes applicable also to cells of irregular form. Great accuracy is not attained by this modified method, its chief merit lying in the saving of time and material. Measurements were made of osmotic pressures in cells of mosses and algae and the differential permeability of the cells of algae to certain chemicals was approximated.—*O. L. Inman*.

6734. SEIFRIZ, WILLIAM. Phase reversal in emulsions and protoplasm. *Amer. Jour. Physiol.* 66: 124-139. 1923.—Clowes' hypothesis that change of permeability is due to reversal of emulsion phases caused by the presence of mono- and bivalent cations was tested and is believed to rest upon very insecure foundation. A considerable number of emulsifiers and of cations were used in studies of emulsions. "Olive oil emulsions in which 1 of the soaps—sodium oleate or sodium stearate—is the emulsifier, are oil-in-water systems which are reversible with BaCl_2 ." Those with "casein, gliadin, cholesterol, or cephalin as the aqueous phase, form water-in-oil systems which are reversible with NaOH ;" and those with "saponin (senegrin, smilacin), gelatose, gum arabic, albumin, lecithin, or plant extract," as emulsifier "form oil-in-water systems which are not reversible with BaCl_2 ." Sodium chloride did not reverse any of the emulsions studied, but rather caused separation of the 2 liquid phases. Hence its importance in causing changes in permeability of plasma membranes cannot be associated with emulsion phase reversals. Neither the valency of the cations nor differences in the activities of anions and of cations can at present be held responsible for phase reversals. The type of emulsifier is significant.—*Ernest Shaw Reynolds*.

6735. STEARN, ESTHER WAGNER, AND ALLEN E. STEARN. The role of hydrogen ion concentration in the action of dyes on bacteria. *Amer. Jour. Public Health* 14: 409-412. 1924.—Seven cultures of bacteria, previously isolated and classified as belonging to the water-borne lactose-fermenting group, when grown in alkaline gentian-violet broth, absorbed the dye. Addition of small amounts of acid caused the dye to be reliberated, while further additions of alkali caused it to be reabsorbed. A similar experiment with *B. aerogenes* in tubes lightly and varyingly buffered at 6.8, so that change in pH would take place at varying rates, showed a regular gradation of dye absorption correlated with the final pH as determined electrometrically. Dead bacterial growth shaken in dye solutions of varying pH gave similar results. On the contrary the acid dyes, acid fuchsin and ponceau, combined only in acid solution. The authors explain the behavior by considering that the bacterial proteins absorb the stains and that they are amphoteric, acting as weak bases in acid solution and as weak acids in basic solution. Basic dyes are therefore absorbed in basic solution and acid dyes in acid solution.—*C. A. Ludwig*.

6736. WEILER, A. Das Blüten in Blättern. [Bleeding in leaves.] *Ber. Deutsch. Bot. Ges.* 39: 50-56. 1921.—Pointing out that it is still unsettled whether known cases of "bleeding" in leaves have their seat in the leaf tissue or in the conducting system of the twigs, the author calls attention to an earlier over-looked study by Schroeder and Reuss bearing indirectly on the question. This was a translucency of leaf tissue, induced by action of SO_2 and misinterpreted by them, but shown by the author to originate in a bleeding from leaf cells into intercellular spaces. The author finds this to be a general though not universal phenomenon producible by various substances. His experiments are interpreted as showing that it is due to alterations of osmotic pressure in the cells produced by action of the special

substance, not directly as an additional osmotic material, but indirectly as a stimulus evoking transformations of material in the cells. The osmotic action is interpreted as following from differences of pressure on opposite sides of the cell—higher towards the veins and lower away from them—which state is supposed to ensure a movement of water in the direction of lower concentration from cells to spaces. This study suggests that the natural bleeding of leaves may originate within the leaves themselves.—*W. F. Ganong.*

WATER RELATIONS

6737. GAVARRA, PERPETUO, AND R. B. ESPINO. Foliar transpiring power of different varieties of abaca grown at the College of Agriculture. *Philippine Agric.* 12: 135-140. *Fig. 1-2.* 1923.—Varieties of abaca (*Musa textilis*) are shown to differ in transpiring power and drought resistance. The daily march of transpiring power was similar to that for the coconut.—*Sam F. Trelease.*

6738. GRADMANN, HANS. Die Windschützeinrichtungen an den Spaltöffnungen der Pflanzen. [Wind protection devices of stomata.] *Jahrb. Wiss. Bot.* 62: 449-527. 1923.—The author studied the significance of sunken stomata and similar structures and this paper attempts to explain them on a physical basis. He used artificial stomata, consisting of glass cylinders filled with KOH. The amount of CO₂ absorbed from the atmosphere could then be determined by weight as well as the amount of H₂O lost by evaporation. The relation between the 2 varies with the speed of the air current passing over the opening. The stronger the wind, the less CO₂ is absorbed with respect to the evaporation, and cylinders of KOH which are protected from the wind absorb relatively great amounts of CO₂. Plotting the amount of CO₂ absorbed against the amount of H₂O given off it was found that with no air movement there is a linear relation, but as the speed of the wind is increased the CO₂ absorption falls off rapidly with respect to the evaporation. Similarly, in the leaf parenchyma the CO₂ absorption will be favored the better the tissue is protected from the wind. Numerous devices in the plant serve this purpose, such as sunken stomata, cuticular stomatic pores, chambers back of the stomata, raised edges of the opening, etc. All of these produce in a purely mechanical manner, a greater CO₂ absorption for a given transpiration and vice versa. The ecological significance of these arrangements is evident from their strong development in situations where water is lacking.—*S. F. Cook.*

6739. HORN, TRUDE. Das gegenseitige Mengenverhältnis der Kohlenhydrate im Laubblatt in seiner Abhängigkeit vom Wassergehalt. [The proportion of carbohydrates in foliage leaves in relation to water content.] *Bot. Archiv.* 3: 137-172. 1923.—In withering leaves of *Tropaeolum majus* starch is broken down into sugar. Cane sugar steadily increases with decreasing water content. The hexoses increase only after prolonged wilting. The quantity of cane sugar is a function of the water content; with increasing water content the quantity of cane sugar decreases, and vice versa.—*William Seifriz.*

MINERAL NUTRIENTS AND SALT RELATIONS

6740. MCHARGUE, J. S. The association of manganese with vitamins. *Jour. Agric. Res.* 27: 417-424. 1 *pl.* 1924.—Plant physiologists and biochemists everywhere are endeavoring to ascertain the function of each of the elements that occur in plants and animals. Since manganese is a constituent of both plants and animals to which little attention has been given from the standpoint of a necessary factor in animal nutrition, it is of interest to point out the close association of this element with certain plant and animal products which are recognized as important sources of unidentified food factors. Data are presented which show that manganese occurs in greatest concentration in the pericarp and germ of wheat, barley and rice. When these cereals are highly milled by the more modern processes the resulting products, patent flour, pearled barley and polished rice become demineralized, manganese being one of the minerals which is largely carried away in the resulting offal. Data are also presented which show that the livers of domestic animals, cod fish and fresh water fish are relatively rich in manganese. It is a well known fact in animal nutrition that the livers of animals are also peculiarly rich in vitamins. A further parallelism is shown to exist in the occurrence of manganese and vitamins in the roe of fish and yolk of eggs, in tomatoes,

oranges and lemons, in colostrum and in the fresh milk of cows later in lactation. The facts that manganese is a necessary element in plant growth and that it is found in largest quantities in plant and animal tissues which contain the greatest vitamin potency, leads the author to assume that a relationship exists between this element and the vital factors contained in these tissues.—*Author*.

6741. BUSCALIONI, L., E G. ROCCELLA. *Le emissioni di ossigeno attivo da alcuni organi delle piante*. [Emission of active oxygen from plant organs.] *Malpighia* 29: 468-484. 1923.—A historical review summarizing previous work on the subject takes up most of the introduction. The authors' investigations will be described in a continuation of the article.—*Edith K. Cash*.

PHOTOSYNTHESIS

6742. KOSTYTSCHEW, S., E. TSWETKOWA, AND M. TILLMANN. *Untersuchungen über die Ernährung der grünen Halbschmarotzer*. [Nourishment of green hemi-parasites.] *Beih. Bot. Centralbl.* I Abt. 40: 351-373. 1924.—Thirty-seven experiments testing photosynthesis and water absorption show that the photosynthetic work of green hemi-parasites of the Rhinanthaceae is as vigorous as that of autotrophic plants of the same family.—On the other hand, water absorption from the soil by the roots of the Rhinanthaceae is entirely insufficient. They take from the host especially fluid water, which is indispensable. The absorption of organic material from the host is not essential.—*L. Pace*.

6743. MAIGE, A. *Variations du seuil de condensation amylogène avec la température*. [Variations of the threshold of starch formation with temperature.] *Compt. Rend. Soc. Biol.* 90: 685-687. 1924.—By the "threshold of starch formation" is meant the critical concentration of sugar at which starch forms in the plastids. Using bean embryos it was determined that high and low temperatures depress the starch forming activity of the cell, which is shown by an elevation of the threshold of condensation.—*Oran Raber*.

6744. OWEN, OWEN. *Carbon dioxide in relation to glasshouse crops. Part I*. *Ann. Appl. Biol.* 10: 312-317. 1923.—Analyses made in a Haldane portable apparatus showed that no stratification of CO₂ occurred in cucumber houses. It was found, however, that the average concentration varied fairly regularly with time, the maximum being between 4 a.m. and 7 a.m., and the minimum, between noon and 3 p.m. Neither increase in concentration nor presence of plants caused detectable stratification.—*J. H. Craigie*.

6745. OWEN, OWEN, AND P. H. WILLIAMS. *Carbon dioxide in relation to glasshouse crops. Part II*. *Ann. Appl. Biol.* 10: 318-325. 1923.—Previous investigators have drawn attention to the possible increase in crop-yield from artificial enrichment of the air by CO₂. An attempt was made to evolve a method for obtaining a given concentration which would persist. Preliminary experiments in a normal cucumber house showed that the CO₂ disappeared as soon as put in. Even after the avenues of escape were closed a similar loss resulted. A high initial concentration was obtained by the decomposition of NaHCO₃ in rectified H₂SO₄. Atmospheres containing up to 200 parts in 10,000 of air were thus prepared. A definite loss of CO₂ (shown by a curve) always resulted. By the addition of CO₂ at regular intervals of time, an average concentration was maintained.—*J. H. Craigie*.

METABOLISM (GENERAL)

6746. ACUÑA, EULOGIO M. *The vitamine B content of some Philippine fruits and vegetables*. *Philippine Agric.* 12: 293-302. 1923.—The pods of paayap (*Vigna sinensis*) were found to be a good source of vitamin B, rats being used as indicators. Bananas contained less of the vitamin, and papayas (*Carica papaya*) still less.—*Sam F. Trelease*.

6747. BELL, MARION, AND LAFAYETTE B. MENDEL. *The distribution of vitamin B in the wheat kernel*. *Amer. Jour. Physiol.* 62: 145-161. 1922.—Mice were fed with various milled wheat products with the following results: Patent flour showed "no appreciable vitamin," 1st clear and 2nd clear were about equal in vitamin concentration to the entire wheat grain, low grade flour and bran had twice as much vitamin, and the standard middlings which contained most of the embryo had a concentration of 4 times as much as the entire grain. Hand dissected grains showed that while the embryo contains a greater concentration of vitamin than the endosperm, it has only about $\frac{1}{3}$ the total quantity in the entire grain, due to the small size of the embryo relative to the endosperm.—*Ernest Shaw Reynolds*.

6748. BEZSSONOFF, N. Une condition complémentaire de l'épreuve au réactif de la vitamine C. [A condition complementary to the test by the reagent for vitamine C.] Bull. Soc. Chim. Biol. 6: 220-225. 1924.—Replying to Wedgewood and Ford (see this issue, Entry 6761) it is pointed out that the blue coloration with phosphomolybdotungstic acid obtained with substances rich in vitamin C is not due to the vitamin itself, but to an unstable radical which accompanies it, or is detached from it, and which is probably an ortho- or para-diphenol. The reaction is much more intense when the solution is heated to 50-60°C. prior to the test. Sauerkraut has high antiscorbutic potency when freshly made but progressively loses value on keeping. Freezing and thawing produces entire loss of potency. Juice of a potent sample loses all antiscorbutic value within 24 hours after extraction, the power to react with the Bezssonoff reagent being lost more gradually. The amounts given to animals in the feeding tests of Wedgewood and Ford were in every case too small to afford protection.—*Joseph S. Caldwell.*

6749. DAVIDSON, JEHIEL, AND EDGAR T. WHERRY. Changes in hydrogen-ion concentration produced by growing seedlings in acid solutions. Jour. Agric. Res. 27: 207-217. 1924.—Wheat seedlings were grown in solutions of HCl, HNO₃, H₂SO₄, H₃PO₄, and of formic, acetic, oxalic, succinic, benzoic, and phthalic acids. The changes in reaction produced by their growth, recorded at certain intervals, show that of the inorganic acids, the greatest changes were produced in HNO₃ at early stages of growth of the seedlings and in H₃PO₄ at later stages. Phosphorus and N being the most essential elements of plant growth contained in the acids used, it may be concluded that the changes in initial reaction produced by plants in the medium in which they grow are due to absorption rather than to neutralization.—The previous growth of the experimental seedlings in nutrient solutions deficient in acid-forming elements diminished their ability to decrease the acidity of the acid solutions. Apparently the deficiency of the previous nutrient solutions produced functional disturbances in the seedlings.—The greatest changes from the initial reactions were produced in the solutions of the organic acids. This, however, may have been due partly or wholly to microbiological activity and needs to be studied further.—*J. Davidson.*

6750. JONES, D. B., AND J. C. MURPHY. Cystine deficiency and vitamin content of the lentil, *Lens esculenta* Moench. Jour. Biol. Chem. 59: 243-253. 1924.—The proteins of the lentil, like those of beans of the genus *Phaseolus*, are limited in their nutritive value by a deficiency of cystine.—*G. B. Rigg.*

6751. KISSER, JOSEF. Histochemische Untersuchung einiger flavonführender Farbhölzer. [Histochemical study of some flavone-bearing dye-woods.] Sitzungsber. Akad. Wiss. Wien [Math.-Nat. Kl.] I Abt. 132: 19-33. 1923.—The microvaporization method devised by Klein, in which sections are subjected to HCl vapor at 40°C., was employed to determine the nature of the crystalline derivatives from a number of wood-dyes. The process was varied also by dissolving as much of the dye as possible from pulverized wood in alcohol or acetic acid, and exposing the solution to HCl vapor without warming. By this means crystalline acid-addition products of the flavones present are produced, and the localization of the dye in sections can be determined. The dye substances are found principally in the cell wall, and but rarely in the cell contents where they are held in absorption by gum-like masses. The species investigated, together with their characteristic dyes were: *Caesalpinia echinata*, *C. Sappan* (brasilin); *Robinia pseudoacacia* (robinin); *Rhus cotinus*, *R. coriaria* (fisetin); *Chlorophora tinctoria*, *Machura aurantiaca*, and *Artocarpus integrifolia* (morin). In each case the properties of the crystalline product and its solution when treated by various microchemical reagents are listed. Similar crystalline products were not obtained from *Haematoxylon campecheanum*.—*F. Weiss.*

6752. KOMATSU, SHIGERU, AND MOTARO ISHIMASA. On the biochemical study of the ripening of the Kaki-fruit. V. Jour. Biochem. Tokyo 3: 261-272. 1924.—Continuing earlier work by the senior author with Ueda and with Ueda and Ishimasa (see Bot. Absts. 12, Entries 5948-5951) in which the chemical changes occurring during growth and ripening of a non-astringent variety of persimmon known as Anasi were investigated, the present paper presents the results of a similar study of 2 astringent strains known as Marugaki and Daishiro, with data on the nonastringent variety Saijo for comparison. Samples were taken at in-

tervals of 7 to 15 days from July 26 to November 21 in the case of Marugaki and from September 30 to January 9 for the other varieties. There is a steady increase in the total sugar due to increase in both reducing sugars and sucrose, with an increase in soluble pectin, up to maturity on September 18. From that date onward the reducing sugars rapidly increased by inversion of sucrose. The soluble tannins began to decrease at maturity, the rate of decrease being very slow when compared with that found in nonastringent varieties. The content of polysaccharides and of cellulose decreased slowly throughout growth and ripening. The N content underwent an increase during late growth and maturity, contrary to the results found with nonastringent varieties. The change from non-edible to edible condition in ripening is due to increase in reducing sugar with concurrent decrease in organic acids and in soluble tannin. Further work on the mechanism of the conversion of soluble tannin into insoluble form is promised.—*Joseph S. Caldwell.*

6753. MIGNON, HELEN L. Biological food tests. IV. The protein and the vitamin A content of the English walnut. *Amer. Jour. Physiol.* 66: 215-231. 1923.—Meal made from English walnuts with the oil removed, and the globulin isolated from such meal, both proved to be adequate protein sources for white mice at 12% and 18% levels of intake. Globulin-free meal was also adequate although unknown materials caused some "alimentary disturbances which interfered with the normal development of most animals." The Vitamin-A of these nuts is not sufficient in quantity to furnish the necessary amount in a rat's diet, but a hot alcohol extract when concentrated may provide enough of this vitamin. Very little is found in the ether extract, or in the expressed oil from walnut meal.—*Ernest Shaw Reynolds.*

6754. MIYAKE, SUGURU. Chemical studies of corn pollen. II. Carbohydrates and organic bases. *Jour. Biochem. Tokyo* 3: 169-176. 1924.—Continuing previous work (*Jour. Biochem. Tokyo* 2: 27. 1923) the author has determined the nature of the carbohydrates in corn pollen. The alcohol extract contained sucrose, glucose and fructose, and gave some of the general reactions for pentose, but neither xylose, arabinose nor methylpentose could be detected by specific tests. The water extract contained dextrin. The water- and alcohol-insoluble residue after treatment with malt extract and hydrolysis with H_2SO_4 , contained only glucose and xylose. The organic bases isolated were adenine and choline. Tests for guanine, xanthine, and hypoxanthine gave negative results.—*Joseph S. Caldwell.*

6755. MORGAN, AGNES FAY. Biological food tests. I. Vitamin A in some citrus fruit products. *Amer. Jour. Physiol.* 64: 522-537. 1923.—Feeding tests upon albino rats and mice demonstrated that the vitamin A content of orange oil extracted by ether or by cold pressure from fresh ripe navel oranges, was equal or superior to fresh commercial codliver oil. From Valencia oranges which had hung upon the tree several weeks and from orange peel distilled with steam, the orange oil contained practically no vitamin A. Orange juice and dried outer orange peel were effective sources for the vitamin, similar lemon peel was less effective, while lemon oil obtained by cold pressure and dried grapefruit peel were ineffective.—*Ernest Shaw Reynolds.*

6756. MORGAN, AGNES FAY, BERNICE M. NEWBECKER, AND ELIZABETH BRIDGE. Biological food tests. V. The biological value of almond proteins and of almond oil. *Amer. Jour. Physiol.* 67: 173-192. 1923.—"Forty-nine per cent of the N of almonds is extractable by distilled water, 27% by 0.1 saturated $(NH_4)_2SO_4$ solution, and 27% by 10% NaCl solution." One or 2 globulins and a protein are present in almonds. The isolated globulin is insufficient to support normal growth of mice, while the oil-free total proteins are adequate. With the globulin removed the proteins are still adequate for almost normal growth. Mice fed upon almond oil show vitamin A deficiency chiefly in their fertility, but rats show the usual signs of such lack, both in curative tests and in growth tests.—*Ernest Shaw Reynolds.*

6757. MORGAN, AGNES FAY, AND HELEN D. STEPHENSON. Biological food tests. III. Changes in vitamins A and B of the globe artichoke due to various canning and drying processes. *Amer. Jour. Physiol.* 65: 491-502. 1923.—Freshly boiled artichoke is an excellent source for vitamin A but approximately $\frac{1}{2}$ as valuable for vitamin B. Canning or drying seems to have little effect upon the vitamin A, but vitamin B is rather readily destroyed and especially by long exposure to low drying or intermittent sterilizing temperatures.—*Ernest Shaw Reynolds.*

6758. MORGAN, AGNES FAY, AND MARGARET S. CHANEY. Biological food tests. VI. Further experiments upon the vitamin A and B content of citrus fruit products. *Amer. Jour. Physiol.* 68: 397-406. 1924.—Orange juice, peel and oil have a high vitamin A content; lemon juice and ether extract of peel have a slight curative effect; while grape fruit failed to demonstrate any vitamin A content. The characteristic lipochromes in these fruits may possibly be correlated with vitamin content. Home-made orange marmalade and candied peel have higher vitamin A content than commercial samples tested.—*Ernest Shaw Reynolds.*

6759. PALMER, L. S., AND H. H. KNIGHT. Anthocyan and flavone-like pigments as cause of red colorations in the hemipterous families of Aphideae, Coneideae, Lygaeidae, Miridae, and Reduviidae. *Jour. Biol. Chem.* 59: 451-455. 1924.—The red and yellow colors seen in the stink-bug (*Perillus bioculatus* Fab.) are caused largely by carotin, derived from its food which consists almost wholly of the highly pigmented eggs, larvae and adults of the potato beetle (*Leptinotarsa decemlineata* Say), which, in turn, derive their carotin from the carotin-rich potato plant. Red pigment in both phytophagous and predaceous families of Hemiptera is not limited to 1 type of substance. Water-soluble pigments appear to be more common than carotin. One aphid owes its vermilion color chiefly to an anthocyan-like pigment, although small quantities of carotin are also present. A number of species of bugs that feed on plants owe their red color to a flavone-like pigment.—*G. B. Rigg.*

6760. POZERSKI, E. Sur l'excrétion de composés phosphorés par les Bacilles de Shiga. Modification de cette propriété lorsque les microbes ont poussé sur un milieu partiellement déshydraté. [Excretion of phosphorus compounds by Shiga's Bacillus. Modification of this property when grown on a partly dehydrated medium.] *Compt. Rend. Soc. Biol.* 90: 602-604. 1924.—When grown on solid media Shiga's Bacillus excretes P-containing products as long as it is living. If the medium is allowed to dry out partly, much more excretion results. The addition of water reduces the behavior to normal.—*Oran Raber.*

6761. WEDGEWOOD, PAUL E., AND FLORENCE L. FORD. Sur la valeur de la réaction de Bezssonoff comme indicateur de la présence de la vitamine C dans le jus de choucroute. [Value of Bezssonoff's reaction as indicating the presence of vitamin C in juice of sauerkraut.] *Bull. Soc. Chim. Biol.* 6: 217-219. 1924.—The juice of pickled cabbage gives a strong blue coloration with Bezssonoff's phosphomolybdotungstic reagent (see this issue, Entry 6748) as do the juices of fresh tomatoes, cabbage, and oranges, all of which are rich in vitamin C. The juice is without value as an antiscorbutic agent for guinea pigs, as animals kept on a scurvy-producing diet to which varying amounts of juice of sauerkraut were added succumbed with all the typical lesions of severe scurvy. The reagent is therefore not infallible as an indicator of the presence of vitamin C and must be checked by animal experimentation.—*Joseph S. Caldwell.*

METABOLISM (NITROGEN RELATIONS)

6762. BRISTOL, B. MURIEL, AND HAROLD J. PAGE. A critical enquiry into the alleged fixation of nitrogen by green algae. *Ann. Appl. Biol.* 10: 378-408. 1923.—From time to time the claim has been made that certain chlorophyll-bearing organisms are able to derive their N directly from the air. The present work was undertaken to test the results obtained by Wann, from which he concluded that green algae, in the presence of nitrate and glucose, were capable of assimilating free N from the air. Following his cultural technique and working with pure cultures of 4 species of green algae used by him, under conditions as nearly as possible identical with his, the authors have failed to corroborate his results.—*J. H. Craigie.*

6763. CAMPBELL, F. LESLIE, AND WILLEM RUDOLFS. Studies on the chemical changes occurring in a sprinkling filter. *Amer. Jour. Public Health* 14: 398-401. 2 fig. 1924.—Most of the nitrification in a sprinkling filter takes place at the bottom. This greater efficiency at the bottom is probably due to the fact that the sewage must there filter slowly through old solids. Nitrification reached its lowest ebb in the beginning of spring when the beds were loaded with solids. A little later, when the solids were becoming loosened and carried away, conditions for nitrification again became more favorable. Denitrification probably takes place at all times but is masked by nitrification unless carried on more rapidly than the latter.—*C. A. Ludwig.*

6764. STEVENS, J. W. Can all strains of a specific organism be recognized by agglutination? Jour. Infect. Diseases 33: 557-566. 1923.—The legume bacteria, commonly classified into 7 groups on the basis of the host plants, may be further subdivided into groups which serologically are quite different, by the agglutination test. The serologic differences of the legume bacteria may be associated with other differences such as nitrogen-fixing powers.—*R. L. Starkey.*

METABOLISM (ENZYMES, FERMENTATION)

6765. AMOS, A., AND H. E. WOODMAN. Sunflower silage. Jour. Agric. Sci. 13: 163-168. 1923.—Certain disadvantages of the sunflower as a silage crop are pointed out. It is shown that the protein of sunflower is somewhat more stable during ensilage than that of oats and tares. From the value of the digestion coefficients of the two types of protein as measured *in vitro* it is concluded that as a source of digestible protein sunflower is inferior to oats and tares.—*J. W. Shive.*

6766. BURGE, W. E. The effect of high and low temperatures on the catalase content of *Paramecium* and *Spirogyra*. Amer. Jour. Physiol. 65: 527-533. 1923.—A 0.05 cc. quantity of *Paramecium* culture, measured by an especially adjusted apparatus, was tested as to its catalase content by determining the rate of evolution of O_2 from neutral H_2O_2 . Minced *Spirogyra* (1.25 gm.) was similarly tested. Low temperatures decreased, while high temperatures increased catalase activity (content?) in both cases. Light increased catalase activity in the alga. These results are related to corresponding changes in the respiratory metabolism of organisms.—*Ernest Shaw Reynolds.*

6767. DENIER ET VERNET. Etude bactériologique de la coagulation naturelle du latex d'hévéa. [A bacteriological study of the natural coagulation of rubber latex.] Ann. Mus. Colonial Marseille 72: 89-96. 1919.—A study was made of the microscopic flora of the latex of rubber (*Hevea brasiliensis*) with special reference to the part it plays in natural coagulation. Twenty-eight organisms were isolated from the latex, and a series of experiments was carried out to test their action on gelatin, albumin, milk, saccharose, lactose, and on a serum prepared from the latex. The authors note that only one microorganism (designated as No. 1) has the property of transforming the sugars of this serum into acids.—*Margaret Buwens.*

6768. FROUIN, A., ET [MAYLIS] GUILLAUMIE. Utilisation des sucres: lactose, maltose, saccharose tréhalose, par le Bacille tuberculeux. [Utilisation of lactose, saccharose, maltose, and trehalose by *Bacillus tuberculosis*.] Compt. Rend. Soc. Biol. 88: 1002-1004. 1923.—The tuberculosis bacillus can use ordinary disaccharides and also trehalose. The latter suggests a relation based upon a common property, between this bacillus and the fungi.—*Oran Raber.*

6769. GODDEN, WILLIAM. Notes on the drainage from tower silos. Jour. Agric. Sci. 13: 462-466. 1923.—Four types of drainage liquids from ensilage were studied with respect to total volume of liquid lost and losses in dry matter, ash, CaO , P_2O_5 , SO_3 , K_2O and crude protein. In 1 case, volatile and non-volatile acids were also determined. A higher percentage loss of dry matter was noted when the material used for ensilage was "sappy." Crude protein in the dry matter from the drainage liquid amounted to 17.4%, in 1 of the 4 types; in the other 3 types the percentage ran to about 30. This difference is ascribed to differences in the nature of the crop used. Differences were also noted in the ratio $CaO:P_2O_5$, and in percentage of K_2O . This is ascribed to the different proportions of the plant ingredients which made up the mixed crop, and to differences in amount of available potash in the soil. The loss of the mineral ingredients referred to may amount to about 2% of that originally present.—*S. Lomanitz.*

6770. KIMURA, TAIZO. Studies on catalytic and oxidative activity. Jour. Biochem. Tokyo 3: 211-260. 1 fig. 1924.—Employing a modification of Gaffcken's apparatus for volumetric determinations of small amounts of gas, the author has studied the catalytic and oxidative activity of heavy metals on H_2O_2 alone and on H_2O_2 and fuchsin. $FeCl_3$ was most active catalytically, followed next by $CuCl_2$ with $CoCl_2$, $PtCl_4$, $AuCl_3$, $SbCl_3$, $NiCl_2$, $HgCl_2$, $ZnCl_2$, and $Pb(NO_3)_2$, less active in the order named. The last 4 were extremely feeble. The activity of $FeCl_3$ decreases with age of the solution as a result of increase in hydrolysis, the

catalytic activity being due to concentration of the metallic ion. The H-ion concentration also affects the rate, which is greatest at pH 3 and falls off steadily to pH 10, both for FeCl_3 and CuCl_2 . The oxidative activity of the same series of metals was tested, employing the decolorizing effect of H_2O_2 on fuchsin in the presence of the metal as a standard. FeCl_3 acts strongly at room temperature and CuCl_2 , only when heated; AuCl_3 and PtCl_4 precipitate fuchsin and hence do not give a distinct reaction. All the others are very weak, the oxidative activity paralleling the catalytic activity. Addition of a small amount of kaolin increases catalytic and oxidative activity of FeCl_3 , while larger amounts decrease both. This is also the case with additions of lecithin, cephalin, and albumin. The presence of an Fe salt markedly retards the activity of hemase on H_2O_2 , while the presence of hemase accelerates both catalytic and oxidative activity of Fe salts. Peroxidase retards the activity of hemase, while the presence of hemase increases the activity of oxidase and peroxidase, if a large amount of H_2O_2 is present, by decomposing the excess of peroxide; but this same action decreases their activity if only small amounts of H_2O_2 are present.—*Joseph S. Caldwell.*

6771. LEVINE, P. A. Adenosin hexoside from yeast. *Jour. Biol. Chem.* 59: 465-472. 1924.

6772. MIYAKE, KOJI, AND MITSUJI ITO. On lethal temperature of pure Koji-diastrase in aqueous solution and recovery of its action after heating. *Jour. Biochem. Tokyo* 3: 177-194. 1924.—In an earlier paper (see *Bot. Absts.* 12, Entry 5973) the authors reported that koji-diastrase in aqueous solution withstands momentary heating to 140°C ., and partially recovers activity after heating to lower temperatures when subsequently allowed to stand for some time at room temperature. The work has been repeated with a carefully purified ash-free diastrase from rice. Heating the enzyme in aqueous solution to 40° , 55° , 70° , 85° , and 100°C . for periods ranging from 1-60 minutes produces a progressive diminution of activity both with increase in time and in temperature; very slight activity persists after heating to 100° for 60 minutes or to 120° for 30 minutes, or for 130° for a "moment." In all cases in which the heating was not sufficiently severe or prolonged totally to destroy diastatic activity there was a partial recovery after standing at laboratory temperature for some hours or days, the increase in activity being proportional to the length of time of standing. The authors consider that recovery of activity is due to the fact that heating produces a coagulum proportional in amount to the degree and time of heating but that this gradually redissolves on standing at a rate proportional to the rate of recovery. The criterion employed for determining the amount of activity or degree of its recovery was the amount of KMnO_4 required for titration of the sugar formed from soluble starch under toluol. In the case of the lower temperatures and shorter periods the differences are large, but the amounts of KMnO_4 required for titration of the solutions heated to 100° for 120 minutes; 120° for 15 and 30 minutes; and 130° , after allowing them to act upon soluble starch for 100 hours, exceed the requirements of the checks only by 0.1 or 0.2 cc.—*Joseph S. Caldwell.*

6773. MULLER, L. Recherches sur le mécanisme de la réaction d'Endo. De la production par certaines Bactéries de substances a réaction aldéhydique. [Mechanism of the Endo reaction. Production by certain bacteria of substances with an aldehyde reaction.] *Compt. Rend. Soc. Biol.* 90: 653-655. 1924.—Evidence is brought forward that the Endo reaction is only a bacteriological application of the Schiff reaction known to chemists. The aldehydes seem to be produced along with the acids from fermentable sugars present.—*Oran Raber.*

6774. RONA, P., C. VAN EWEYK, AND M. TENNENBAUM. Über die Wirkung der Alkaloide aus der Atropin-, Cocain- und Morphingruppe auf die Hefe-Invertase. [The action of atropine, cocaine and morphine alkaloids on yeast invertase.] *Biochem. Zeitschr.* 144: 490-519. 25 fig. 1924.—All the alkaloids investigated reduced invertase activity, the reduction being approximately a logarithmic function of the concentration of alkaloid. The reduction was affected by H-ion concentration and the effect produced was reversible. The reduction was not affected by change in the optical configuration of the alkaloid, e.g.: l-ecgonine, d-ecgonine. Alkaloid cleavage products were without effect. Tropine was less active than atropine, and tropic acid was inactive. Cocaine was very active, while the ecgonine radical was practically inactive. The activity of morphine and its substitution products was affected by the substitution of an ethoxy group for an H atom.—*H. D. Hooker, Jr.*

6775. VERNET, GEORGES. Notes et expériences sur la coagulation du latex d'hévéa. [The coagulation of Hevea latex.] Ann. Mus. Colonial Marseille 7: 137-167. 1919.—After a discussion of the various theories as to the mechanism of coagulation of latex, evidence supporting the theory that it is due to coagulation of accompanying albuminoids, is presented in detail. Rubber of highest quality is obtained by permitting spontaneous coagulation. Denier has isolated 27 organisms from coagulating latex, all of which liquefy gelatin, digest egg albumin, and convert disaccharides into acids. Since the conditions which favor activity of these organisms are identical with those which favor action of coagulating enzymes, it is difficult to determine whether the coagulation is due to organisms. That this is the case, however, is indicated by the fact that latex drawn with precautions to insure sterility remains liquid indefinitely but coagulates when acidified. The acid serum separating from coagulating latex, after being sterilized in the autoclave, will initiate coagulation in fresh latex, but if previously exactly neutralized it is without such effect. Addition of sugar to latex is as effective in promoting coagulation as addition of acetic acid, since the organisms present convert the sugar to acids which are effective agents in producing the coagulation. An excellent rubber is produced by heating the fresh latex to 120°C. in a slightly acid medium.—Joseph S. Caldwell.

6776. VOSKRESSENSKY, A. La digestion des gommés par les organismes et les ferments. La digestion de la gomme du Cerisier in vitro. [Digestion of cherry-tree gum in vitro.] Bull. Soc. Chim. Biol. 6: 226-230. 1924.—Cherry-gum was not attacked by the enzymes present in aqueous extracts of seeds of lucerne, *Gleditsia*, *Phoenix dactylifera*, white lupine, and sweet almond, or of leaves of cherry or laurel. It was very slowly attacked by Taka diastase and by malt extract, more rapidly by *Aspergillus*, *Mucor* and *Penicillium* and by bacteria isolated from the stomach of the snail. Beer yeasts and bacteria isolated from cheese showed no action. Extracts of liver, stomach, or salivary glands of the snail, of intestine and coecum of the rat, and of pancreas and coecum of the goat showed some digestive action. Rats were able to live on a ration containing 60% of dry cherry gum but not on gum without other food.—Joseph S. Caldwell.

6777. WOODMAN, HERBERT ERNEST. The nature of the pigment of silage. Jour. Agric. Sci. 13: 240-242. 1923.—The paper deals with the chemical changes of silage pigments corresponding to the color changes which the silage undergoes from the green of the newly cut crop to dark olive or dark brown shades, according to the conditions of ensiling. It is shown that the pigment in silage is phaeophytin, the magnesium-free derivative of chlorophyll. This pigment is produced from chlorophyll by the action of carbonic and organic acids developed during fermentation in the silo.—J. W. Shive.

6778. WOODMAN, HERBERT ERNEST, and ARTHUR AMOS. Further investigations into the changes which occur during the ensilage of a green crop. Jour. Agric. Sci. 14: 99-113. 1924.—The experiments described were designed to test conclusions which had already been drawn and to ascertain the extent of the changes and consequent losses sustained by the same crop when ensiled at different stages of maturity. Oats, tares, and beans were selected. The crops were cut at 3 different stages of maturity. Percentages of gains or losses of constituents during ensilage were determined. These are indicated as losses of juice and dry matter, changes in nitrogenous constituents, N-free ether extract and crude fiber changes. It is stated that the conditions controlling the ensilage of oat and tare crops are now understood with sufficient precision to predict the type of silage at the time of filling the silo. For this reason it is predicted that the undesirable "sour" silage will quickly disappear and the 2 kinds of silage which will commonly be made will be (1) the green "fruity" and (2) the "acid brown" types. Results obtained with these 2 types of silage are summarized.—R. P. Marsh.

6779. YOUNG, E. G. The decomposition of glucose by bacteria. Jour. Biol. Chem. 59: Proc. XI, iii. 1924.—The ordinary bacteriological strain of *B. coli communis* apparently contains cells possessing differing types of metabolism.—G. B. Rigg.

METABOLISM (RESPIRATION, AERATION)

6780. AUBEL, E. Sur le métabolisme microbien de l'acide pyruvique. [The bacterial metabolism of pyruvic acid.] Bull. Soc. Chim. Biol. 6: 288-298. 1924.—*Bacillus pyocyaneus*,

B. fluorescens, and *B. coli* were successfully grown in a medium containing 10 to 20 gm. sodium pyruvate, 5 gm. NH_4Cl , 1 gm. K_2HPO_4 and 1 gm. MgSO_4 per l. Analysis of the residues after growth of *B. coli* and *B. vulgaris* in this medium and conversion of the acids present into their Ca salts showed the presence of 12.26 gm. sodium acetate, 0.1347 gm. calcium lactate, 0.0486 gm. calcium glycolate, and traces of formate and propionate. The possible steps in the utilization of pyruvic acid as a source of energy are discussed. An organism isolated from the water supply of Paris converted glucose to pyruvic acid, and the latter to lactic acid. When this organism was grown upon sodium pyruvate, it formed acetic and formic acids but no lactic acid. When grown upon calcium lactate, it formed acetic acid and acetaldehyde but no pyruvic acid. On glucose, it forms pyruvic acid which is utilized as a source of energy, and lactic acid which accumulates as an unused end-product. The formation of lactic acid follows and depends upon the formation of pyruvic acid but the detailed steps in the transformation are unknown.—*Joseph S. Caldwell.*

6781. HUTCHINSON, DOROTHY M. Comparative studies on respiration. XXIII. The effect of adrenalin on the production of carbon dioxide by animals and by plants. *Amer. Jour. Physiol.* 62: 192-196. *Fig. 1, 2.* 1922.—Radish seedlings, when placed in 0.003 and 0.002% solutions of adrenalin showed a falling off of CO_2 production to about 20% at the end of about 15 minutes and then a gradual rise to 74 and 82% respectively. More dilute solutions, 0.0005 and 0.0002%, gave much smaller decrease with a 2nd drop and a final rise to normal in about an hour. Frog muscle gave very similar results. It is believed that rhythmical chemical processes take place in the more dilute solutions, possibly due to oxidation of the adrenalin, which account for the 2nd decrease in CO_2 production.—*Ernest Shaw Reynolds.*

ORGANISM AS A WHOLE

6782. BOËZ, L. Technique d'hémoculture en milieu solide. [The technique of hemoculture in a solid medium.] *Compt. Rend. Soc. Biol.* 90: 809-812. 1 *fig.* 1924.

6783. GRATIA, ANDRÉ, ET BERNICE RHODES. De l'action lytique des Staphylocoques vivants sur les Staphylocoques tués. [The lytic action of living on dead Staphylococci.] *Compt. Rend. Soc. Biol.* 90: 640-642. 1924.—If an emulsion of dead Staphylococci in physiological saline solution is used in place of bouillon the addition of a trace of living Staphylococci will cause a clarification of the solution in 24-48 hours, leaving only a small Gram-negative fragment. It is not necessary to add any of the extracted lysin as in the case of a bouillon emulsion.—*Oran Raber.*

6784. HASTINGS, E. G. Comparative resistance of bacteria from native habitats and from artificial cultures. *Jour. Infect. Diseases* 33: 526-530. 1923.—Spores of *B. anthracis* introduced from their native habitat into water survived 18.5 years. This period was 42 times as long as has been noted by any previous worker. An organism of the *colon-aerogenes* group, after cultivation on artificial media, survived desiccation for 31 days while the same organism cultivated in milk survived the same treatment for 96 days. The same organism on its host (corn stover) was still alive after 7 years. It is believed that weakening of the organisms in most reported instances followed cultivation on artificial media. During this growth, the resistance of the organisms to the unfavorable environment was lowered by exposure to the effects of their by-products.—*R. L. Starkey.*

6785. TORREY, JOHN C., AND MORTON C. KAHN. The inhibition of putrefactive spore-bearing anaerobes by *Bacterium acidophilus*. *Jour. Infect. Diseases* 33: 482-497. 1923.—In 2% glucose-meat-infusion-peptone broth, *B. acidophilus* overgrew the spore-bearing proteolytic anaerobes *B. botulinus*, *B. bifermentans*, *B. histolyticus*, and *B. bellonensis* and inhibited digestion of egg albumin for 10 days, after which growth of the anaerobes predominated. In milk, *B. acidophilus* inhibited growth of the anaerobes for an indefinite length of time. Different strains of *B. acidophilus*, however, differed considerably in antiproteolytic properties. The effects of *B. acidophilus* on growth of the anaerobes may be ascribed to the inhibitory action of the acid which is produced. Digestion by the anaerobes occurs in the media only at pH 5.8 or above and the protein remains intact if sufficient sugar is present in combination with fermenting bacteria to maintain an acidity of pH 6.5 or higher. At the same pH, lactic acid more markedly inhibited growth of *B. sporogenes* than did HCl.—*R. L. Starkey.*

GROWTH, DEVELOPMENT, REPRODUCTION

6786. DOMINGO, PIERRE. Études sur la fièvre de Malte. Réaction actuelle optima des milieux destinés à la culture du *Micrococcus milletensis*. [Optimum reaction of media for the culture of *M. melitensis*.] Compt. Rend. Soc. Biol. 90: 819-820. 1924.—*M. melitensis* grows best at pH 6.8-8.8 with an optimum at 7.6. When grown in media more alkaline than 7 the bacteria acidify the solution until it approaches the optimum.—*Oran Raber*.

6787. ELLIS, M. M. Growth and metabolic changes in maize seedlings treated with insulin or glucokinase. Amer. Jour. Physiol. 68: 119. 1924.—(Author's abstract.) Glucokinase "prepared by Collip's method from onion tops or corn plants" was dialyzed through a Marriott's celloidin tube. The substance remaining in the tube stimulated growth of seedlings, while the dialyzate caused an exudation of a sugary fluid from the hydathodes after 3-4 days, after which the leaves wilted and died. Starch storage in the seedling leaves was abnormal. Crude insulin gave similar fractions by dialysis which gave less marked reactions in the seedlings.—*Ernest Shaw Reynolds*.

6788. ESPINO, R. B., AND S. M. CRUZ. Absorption of complete culture solutions by abaca [*Musa textilis*] roots with reference to growth of branch roots. Philippine Agric. 12: 111-119. 1923.

6789. FROUIN, A., ET MAYLIS GUILLAUMIE. Influence de la concentration de la glycérine dans les milieux de culture sur le rendement en poids du Bacille tuberculeux. [Effect of concentration of glycerin in the medium on growth of *B. tuberculosis* as measured by weight.] Compt. Rend. Soc. Biol. 90: 731-732. 1924.—In acid medium (pH 6.0-6.5) the weight of the organisms after 20 days increases with the concentration of glycerin from 0.241 to 0.293 gm. per 100 cc. The effect is greater at 0.5%-2.0% glycerin than at 2.0%-4.0%. In an alkaline medium (pH 8.1-8.5) there is a slight increase as the glycerin is increased from 0.5% to 1.0% but further increases up to 4.0% have no appreciable effect.—*Oran Raber*.

6790. HILEY, W. E., AND N. CUNLIFFE. Observations on the height growth of trees. Ann. Appl. Biol. 10: 442-451. 1923.—Several investigators have attempted to correlate the intensity of variable environmental factors with fluctuations in the growth of trees. Their observations here summarized indicate that in different countries growth in various species depends on different climatic factors. In a statistical study made during 1920-1922 on European larch, Sitka spruce and Corsican pine, the authors conclude that temperature is the dominant factor in determining the daily fluctuations in growth. They also discover that approximately $\frac{1}{2}$ the annual increment of growth is made at the expense of the food stored up in the tree during the previous year.—*J. H. Craigie*.

6791. SCHILLING, ERNEST. Ein Beitrag zur Physiologie der Verholzung und des Wundreizes. [The physiology of growth of wood and of wound stimuli.] Jahrb. Wiss. Bot. 62: 528-562. 1923.—Experiments were conducted on *Linum usitatissimum* and *Cannabis sativa*. It was found that the living elements of the wood remain potentially capable of growth, and the view expressed in the literature that lignified cells are no longer capable of growth is held to be erroneous. Woody cells can be experimentally stimulated to visible growth and division which may be wholly or partially reversible, and delignified cells may likewise be made to grow and divide. Lignification is no criterion of the physiological age of the cell; it does not regulate the growth but is regulated by growth. As to the stimulus of wounds and of the growth of wound tissue, "wound hormones" in the sense of Haberlandt are not considered to be the cause, but rather disturbances of correlation.—*S. F. Cook*.

6792. SEELIGER, RUD. Ein Spiegelauxanometer für Keimwurzeln. [A mirror auxanometer for showing root growth.] Ber. Deutsch. Bot. Ges. 39: 30-41. 1921.—After comment on the delicacy of the mirror-scale-telescope method of measurement, mention of a forgotten application by Reinke, and a summary of allied methods of auxanographic measurement, the author describes a new instrument. A small sheet iron base carries on vertical supports a rotating horizontal rod parallel to which is attached a small mirror, and at right angles a lever-rod balanced by a sliding weight. On the opposite arm of the lever is hung a support carrying a horizontal cover glass, against the upper surface of which presses the immersed germinating root which is held in a special glass support. The growth of the root turns against the counterweight the rotating rod, which thus turns the mirror. The image of a

scale is read by a fixed telescope in the usual way. Adequate adjustments are provided, and the instrument seems correct in principle and capable of accuracy in practice, as illustrated in a trial example described in the 2nd part of the paper.—*W. F. Ganong.*

GERMINATION, RENEWAL OF ACTIVITY

6793. CHOATE, HELEN A. **Chemical changes in wheat during germination.** *Bot. Gaz.* 71: 409-425. *Pl. 28, 2 fig.* 1921.—This study was made chiefly by microchemical methods supplemented at important points by quantitative analyses. It was found that the principal storage carbohydrate of Marquis wheat is starch in the endosperm. A small amount of sucrose is also present in endosperm and embryo. The first noticeable chemical change during germination is the appearance of dextrin, in the scutellum and coleorhiza and of starch in the root cap. Reducing sugars (probably glucose) appear in the embryo after 18 hours in the germinator. During the germination period studied, the increase in length of the epithelial cells averaged 150%. Peroxidase and catalase are present in all parts of the grain both before and during germination. The amount of catalase present increases during the first 7 days at a rate corresponding to the rate of increase in the respiratory activity. Macrochemical analyses show the presence of amino acids in the ungerminated grain and their increase in amount during germination. Microchemical analyses fail to indicate any amino-N until the 4th day of germination.—*Author.*

6794. GARDNER, WRIGHT A. **Effect of light on germination of light sensitive seeds.** *Bot. Gaz.* 71: 249-288. 1921.—This paper begins with a good review of the literature on the germination of light-sensitive seeds and ends with a rather full bibliography. Several methods of promoting the germination of seeds are described.—The germination of seeds of *Rumex crispus* and *Phorodendron flavescens* is shown to be promoted by light, while the germination of seeds of *Datura stramonium* is hindered by light. Abrasion of the ovary walls of *Rumex crispus* seeds promoted their germination in darkness. Treatment of seeds of *Rumex crispus* and *Oenothera biennis* with H_2SO_4 caused an increase of germination in darkness. No reciprocal relation between the effects of light and temperature was found. Sufficient water for germination was absorbed in darkness. Injection with water did not increase germination in darkness. Many single electrolytes, regardless of the nature of their ions, promoted the germination of seeds of *Oenothera biennis*, *Nicotiana Tabacum* and *Verbascum thapsus* in darkness.—The seeds under investigation increase in acidity during germination.—Evidence is presented showing that light directly or indirectly activates lipolytic enzymes which promote the hydrolysis of the fats contained in these seeds.—*Author.*

6795. HURD, ANNIE MAY. **Effect of unilateral monochromatic light and group orientation on the polarity of germinating Fucus spores.** *Bot. Gaz.* 70: 25-50. *2 fig.* 1920.—Unilateral illumination of germinating Fucus spores with blue or green light (4000-5600 Å. U.) oriented the first cleavage planes and determined the polarity of the sporelings, the cell on the darker side of each spore becoming the rhizoidal cell irrespective of gravity. Red light of equal or greater intensity produced no such effect, the spores germinating just as they did in darkness.—Blue and green light (4000-5200 Å. U.) produced the negative phototropism of the young rhizoids, but red light of the same intensity (1800 meter-candles) caused no tropisms.—The polarity of a spore lying within a distance of 0.2 mm. of another spore was determined by the relative position of the adjacent spore or spores, irrespective of light or gravity. The first cleavage plane was formed perpendicular to the direction of the center of the group and the cell on the inner side became the rhizoidal cell. The term "group orientation" was suggested for this phenomenon.—*Author.*

6796. OPPENHEIMER, H. **Das Unterbleiben der Keimung in den Behältern der Mutterpflanze.** [The suspension of germination in the receptacles of the mother plant.] *Sitzungsber. Akad. Wiss. Wien [Math.-Nat. Kl.] I Abt.* 131: 279-312. *1 pl.* 1922.—This is an attempt to determine the distribution of suppression of germination in seeds, spores, etc. while they are retained in the natural receptacles; and to ascertain what causes inhibit germination in selected instances. Such suppression or delay of germination as is noted in seeds of higher plants while inclosed in the fresh fruit and in gemmae of *Marchantia*, etc. in the receptacles, has been variously attributed to lack of O_2 , physiological drouth due to osmotic effects of the

medium, and to chemical inhibitors.—In the present study the test material was submitted to conditions suitable for germination on filter paper inclosed in petri dishes, and was either surrounded by crushed tissue of the natural receptacle or by a tissue extract, or was washed free and kept moist with water or nutrient solution. The use of toluol to prevent growth of fungi in the crushed plant material was found not to affect germination adversely. The experimental material included gemmae of *Marchantia*, spores of *Funaria hygrometrica*, seed of fleshy and of dry fruit; and anthers of certain plants. Well marked suppression of germination was observed in seeds of tomato, gourd, cucumber, *Nicotiana rustica*, and *Capsicum*. The suppression was nearly proportional to the mass of the fruit substance present, and was overcome by heating the fruit substance or its extract to 100°C. For such cases the existence of chemical inhibitors is postulated. Their nature is unknown but it is suggested that they may be "negative catalysts" influencing respiratory processes; there is no evidence of specific inhibitors. In the tomato, inhibition is present only in the ripe fruit; in *Galanthus nivalis*, inhibition of pollen germination within the anther was noted.—*F. Weiss*.

6797. STRAUSBAUGH, P. D. Dormancy and hardiness in the plum. Bot. Gaz. 71: 337-357. 4 fig. 1921.—A wide difference is found in the hardiness of the varieties of this fruit; hardiness seems closely related to dormancy. The most hardy varieties have most complete dormancy and a constant minimum water content for their buds during the winter. This water is so tenaciously retained during the dormancy of the hardy varieties as to effect protoplasmic changes which may result in increased imbibition.—*Geo. D. Fuller*.

TEMPERATURE RELATIONS

6798. CHILD, C. M., AND A. W. BELLAMY. Physiological isolation by low temperature in *Bryophyllum*. Bot. Gaz. 70: 249-267. 6 fig. 1920.—The paper is a study of the effect on development of the buds in the leaf-notches of *Bryophyllum calycinum*, of cooling a zone of the petiole. This cooling was accomplished by water of controlled temperature flowing through block tin pipe bent into loops or coils as required. Cooling a zone of the petiole 25-30 mm. in length, to a temperature of 2.5-4°C. for a few days did not produce visible physical injury or alteration, but was found to be a very effective means of inducing outgrowth of the leaf-buds. Usually more or less development of buds also occurs on the leaf opposite the one treated and often on leaves of adjoining nodes. Experiments on wilting in dry air show that the cooled zone does not interfere appreciably with the passage of fluids to the leaf; it is, therefore, improbable that the physiological isolation of the leaf-buds results from a blocking of the passage of inhibiting substances transported in these fluids. The authors regard the experiments as indicative but not demonstrative evidence for the view that the dominance of the vegetative tip over the leaf buds depends rather upon transmission or conduction through the tissues of the plant than upon the transport of substances from tip to buds or in any other direction.—*C. M. Child*.

6799. ESTEY, J. R., AND C. C. WILLIAMS. Heat resistance studies. I. A new method for the determination of heat resistance of bacterial spores. Jour. Infect. Diseases 34: 516-528. Fig. 1-3. 1924.—It is suggested that 25-30 tubes containing portions of the same suspension of spores should be used for determining their heat resistance. Results from a small number of tubes give variable results. At least 4 periods of exposure to heat within the range of the killing temperature should be used. Individual spores vary in their heat resistance. The curves of the death courses of spores in suspensions suggest logarithmic death rates.—*R. L. Starkey*.

6800. HYRNIIEWIECKI, BOLESŁAW. O hamu jącym wpływie ciepłych kąpieli na rozwój bulw. [Inhibitory influence of warm water on development of bulbs.] Acta Soc. Bot. Poloniae 1: 20-122. Fig. 11-12. 1923.—While the author lost many data regarding this subject during the events at Odessa in 1918, it is evident from the photographs presented that a temperature of 30°C. inhibits rapid development in *Dahlia variabilis* and *Boussingaultia baselloides*.—*C. W. Dodge*.

6801. SMITH, J. HENDERSON. The killing of *Botrytis cinerea* by heat, with a note on the determination of temperature coefficients. Ann. Appl. Biol. 10: 355-347. 1923.—Spores of *Botrytis cinerea* grown under the same conditions and for approximately the same time were

dropped into distilled water ranging from 30°–50.3°C. From time to time samples were removed and the percentage of germination in Czapek's agar at 24° to 25°C. was determined for each sample. In similar previous experiments with phenol, practically all viable spores germinated in 24 hours. With heat exposure, however, a significant proportion of spores delayed germination beyond 24 hours for a period which was longer or shorter according to the temperature and duration of the exposure. Plotted results give a series of approximately symmetrical sigmoid curves which show that the process of killing falls into 2 stages: the 1st, during which progressively increasing numbers of spores are killed in successive units of time; and the 2nd, during which progressively diminishing numbers are killed. The influence of temperature on the rate of the reaction is remarkably great and the temperature coefficient varies rapidly throughout the range of the temperatures used. A curve is evolved which expresses the whole of the killing process of the spores within the limits of the experiment.—*J. H. Craigie.*

RADIANT ENERGY RELATIONS

6802. ADAMS, J. Relation of flax to varying amounts of light. *Bot. Gaz.* 70: 153–156. 1920.—Flax plants were raised at Ottawa, Canada, in 10-inch pots placed in the open and sunk in the ground up to the brim. From certain pots the light was excluded for 2–2½ hours per day during periods of 11–19 days altogether. The shading of the plants took place between June 12 and July 25, and occurred at or near the time of year when the amount of daylight was greatest. Comparisons were made between the shaded and unshaded plants as regards average (1) height, (2) weight, and (3) number of capsules produced per plant. In every case the unshaded plants gave a higher figure.—*Author.*

6803. BOVIE, W. T., AND G. A. DALAND. New experiments on the sensitization of protoplasm to heat by exposure to light of short wave-length. *Amer. Jour. Physiol.* 66: 55–66. *Fig. 1–2.* 1923.—More complete series of experiments substantiate the conclusions stated in a former paper, that ultra-violet light sensitizes the protoplasm of *Paramecium caudatum* to heat so that death occurs at temperatures which are not normally lethal, namely 27.5°, 30.5° and 34.6°C. for the 5 minutes exposure used. A "latent period" was evident between the exposure to the fluorite light and the changes which were used as the index of lethal effects. This period was shortened in proportion to the height of the temperatures used following the light treatment. Heating the organisms before treatment by the fluorite light did not seem to affect in any way the lethal effects of the light alone [see this issue, Entry 6805.]—*Ernest Shaw Reynolds.*

6804. CHOLODNY, N. Zur Biologie und Physiologie der ableger von *Sempervivum soboliferum*. [Biology and physiology of the reproductive buds of *S. soboliferum*.] *Beih. Bot. Centralbl.* I Abt. 40: 174–182. *Pl. 1, 2 fig.* 1924.—The spherical young plant has, after its separation from the mother plant, the ability to change its position from the side or inverted position. This it does by roots and leaf movements. Light is an important factor in leaf movement. It retards root development. The roots develop better in red light than in the dark. The rosette opens better in red light than in blue.—*L. Pace.*

6805. FORBES, H. S., AND G. A. DALAND. Further experiments on the sensitization to heat due to exposure of short wave lengths. *Amer. Jour. Physiol.* 66: 50–54. 1923.—Direct action both of ultra-violet light and of ozone formed by its action on air kill *Paramecium caudatum*. Heat has "a more lethal effect" upon these organisms following their exposure to ultra-violet light than when they are not thus treated. [See this issue, Entry 6803.]—*Ernest Shaw Reynolds.*

6806. STOPPEL, ROSE. Beitrag zum Problem der Perzeption von Licht- und Schwerereiz durch die Pflanze. [The preception of light- and gravitational stimuli by plants.] *Jahr. Wiss. Bot.* 62: 563–593. *3 fig.* 1923.—Seedlings of *Hordeum* grown in the dark were rotated on a clinostat so as 1st to keep the stimulus equal on all sides, and later to stimulate on 1 side only, keeping the intensity of the stimulus constant. Without entering into detail of the data which include many combinations of long and short periods of geotropic and heliotropic stimulation, it may be said that the results in general showed that bending followed more slowly after stimulation by light than by gravity, but the effects were more definite and last-

ing. This is believed to be due to a physical stimulus in the case of gravity and a chemical one in the case of light, the former being capable of modification by the latter.—*S. F. Cook.*

6807. ZWAARDEMAKER, H. Bioradioactivité et loi de l'entropie. [Bioradioactivity and the law of entropy.] *Compt. Rend. Soc. Biol.* 90: 68-70. 1924.—In the organism there are many processes which continue day and night and which seem to be based upon a series of reactions in a closed cycle. The free energy which enters into these processes or cycles apparently should diminish little by little and the processes finally stop, but they do not. It is proposed that a part at least of the necessary addition of free energy comes from the radioactivity of the potassium in the tissues.—*Oran Raber.*

TOXIC AGENTS

6808. ALLEE, W. C. The effects of potassium cyanide on metabolism in two fresh water arthropods. *Amer. Jour. Physiol.* 63: 499-502. 1923.—In relatively strong concentrations the cyanide caused a smaller consumption of O and a decrease in CO₂ production. In much weaker concentrations the rate of CO₂ production was increased, due, partly as shown by previous work to the K-ion.—*Ernest Shaw Reynolds.*

6809. NICOLAU, G. Sur les effets de l'injection de différentes substances dans le parenchyme des plantes. [Effects produced by injection of various substances into the parenchyma of plants.] *Compt. Rend. Soc. Biol.* 90: 148-149. 1924.—If 2-3 cc. of 4-13% NaCl are introduced into the leaf of *Allium cepa*, the leaf loses its turgidity in about 1 minute. Microscopic examination shows the cells plasmolysed. The effect is reversible if the leaf is washed out with water; otherwise the leaf dies in a few days.—If a 1.25-2% solution is used, the injected liquid increases in volume by the absorption of water and at the end of 3 days is reabsorbed into the plant. The turgidity is not lost.—If the solution is still more dilute (0.3-1%) there is no plasmolysis and the solution is shortly taken into the plant.—The same effects are observed with *Taraxacum officinale*, *Urtica dioica*, *Lamium album*, *Conium maculatum*, *Chaiturus marrubiastrum*, *Sonchus arvensis*, *Curcubita pepo*, etc.—If a 1.5-10% copper sulphate or acetate solution is similarly injected there is no plasmolysis, but the whole plant wilts in a few hours and soon dies. This is a case of general poisoning. If a 0.5% solution is used the injected leaf only is killed.—*Oran Raber.*

6810. PAGE, IRVING H., AND G. H. A. CLOWES. Cytolysis and protoplasmic structure. I. Resistance reversal phenomena in saponin-hypotonic cytolysis. *Amer. Jour. Physiol.* 63: 117-126. 1922.—Eggs of the starfish, sea urchin, sand dollar, an Annelid worm and 1-day-old larvae of the Echinoderms demonstrated the same phenomenon which was shown by Rywosch in relation to the erythrocytes of various mammals. Those eggs which were resistant to hypotonic sea-water showed small resistance to cytolysis by Quillaja saponin and digitonin and vice versa. Fertilization and presence or absence of the jelly around the eggs seems not to affect this reversed reaction.—*Ernest Shaw Reynolds.*

ELECTRICITY

6811. DOGNON, A. Action antagoniste réciproque de diverses longueurs d'onde de rayons X vis-a-vis de la floculation d'une suspension colloïdale. [The reciprocal antagonistic action of X-rays of various lengths in relation to the flocculation of a colloidal suspension.] *Compt. Rend. Soc. Biol.* 90: 778-780. 1 fig. 1924.—A mixture of X-rays of various lengths, which when taken alone cause the flocculation of a suspension of mastic, antagonise each other. The flocculation is diminished or hindered entirely.—*Oran Raber.*

6812. HEILBRUN, L. V. The colloid chemistry of protoplasm. I. General considerations. II. The electrical charges of protoplasm. *Amer. Jour. Physiol.* 64: 481-498. 1923.—By precipitation of protoplasm with various salts and testing the resulting viscosity by the centrifuge method, the electric charges of the protoplasm of sea-urchin eggs and of *Stentor coeruleus* were determined to be positive in the interior and negative on the exterior layer. The coagulating action of the ions determined was in the following ascending order for sea-urchin eggs, Ca, Mg, K, Na, NH₄. For *Stentor* the order was the same except that K and Na were reversed. Various biological phenomena such as vital staining, the different killing power of the various cations, antagonism of ions and the effects of electric currents passing through cells, are correlated with these findings.—*Ernest Shaw Reynolds.*

PHYSIOLOGY OF DISEASE

6813. ROSENOW, EDWARD C. Changes in streptococcus from encephalitis induced experimentally and their significance in pathogenesis of epidemic encephalitis and influenza. *Jour. Infect. Diseases* 33: 531-556. *Fig. 1-13*. 1923.—It is concluded from a considerable number of experiments on animals inoculated with organisms isolated from cases of influenza and encephalitis that the same streptococcus may give rise to these widely different diseases, depending on whether it is in the virulent or pneumotropic phase, when influenza would result; or in the less virulent but neurotropic phase, when polioencephalitis and allied conditions would be prone to develop. The microorganism changed in morphology, cultural characteristics, infecting power, and immunologic state under the varied conditions.—*R. L. Starkey*.

6814. WEINBERG, M., ET P. GOY. Recherches sur la toxine botulinique. [Researches on botulinus toxin.] *Compt. Rend. Soc. Biol.* 90: 269-271. 1924.—The most virulent toxin is produced when the organism is grown on a natural medium such as vegetables and especially on concentrated meats.—*Oran Raber*.

6815. WEISS, FREEMAN. The effect of rust infection upon the water requirement of wheat. *Jour. Agric. Res.* 27: 107-118. 1924.—Marquis wheat was grown to maturity in quartz sand cultures to which various combinations of mineral nutrients were added in solution. In 3 series of cultures receiving otherwise identical treatment, infection by stem rust (*Puccinia graminis tritici*) was induced by artificial inoculation in (1), by leaf rust (*Puccinia triticea*) in (2), while (3) was left uninoculated. Rust infection did not materially alter the amount of water used by the wheat during its entire growth period, but caused reduction in yield of both tops and grain; that is, it increased the water requirement per unit of dry matter. No well marked effect on susceptibility to infection or amount of injury suffered was observed from variations in the potash and phosphate nutrition of the host. However, increase in N in the nutrient solution resulted in somewhat greater susceptibility to infection, and increase in Ca was associated not only with lowered susceptibility to rust infection but with a materially lower water requirement in rusted as well as rust-free plants.—*Author*.

6816. WERKMAN, C. H., V. E. NELSON, AND E. I. FULMER. Immunologic significance of vitamins. IV. Influence of lack of vitamin C on resistance of the guinea-pig to bacterial infection, on production of specific agglutinins, and on opsonic activity. *Jour. Infect. Diseases* 34: 447-453. 1924.—Animals supported by a diet deficient in vitamin C were less resistant to *Pneumococcus* and *B. anthracis* than normal animals. This difference in nutrition did not affect the phagocytic mechanism nor the production of agglutinins in *B. typhosus*.—*R. L. Starkey*.

MISCELLANEOUS

6817. ANONYMOUS. [Rev. of: CLARK, W. MANSFIELD. The determination of hydrogen ions; an elementary treatise on the hydrogen electrode, indicator and supplementary methods with an indexed bibliography on applications. 2nd ed., 480 p. Williams and Wilkins Co.: Baltimore, Md., 1923.] *Nature* 113: 157-158. 1924.

6818. ANONYMOUS. [Rev. of: KOLTHOFF, I. M. Der Gebrauch von Farbenindikatoren: ihre Anwendung in der Neutralisation-analyse und bei der colorimetrischen Bestimmung der Wasserstoffionkonzentration. (Use of color-indicators in neutralization analysis and in colorimetric determination of hydrogen-ion concentration.) 2nd ed., ix + 220 p. Julius Springer: Berlin, 1923.] *Nature* 113: 157-158. 1924.

6819. CASTILLE, A., AND VICTOR HENRI. Méthodes de purification des dissolvants organiques: Alcool, ether, hexane. [Methods of purifying organic solvents: alcohol, ether, hexane.] *Bull. Soc. Chim. Biol.* 6: 229-302. 1924.—Special methods which yield extremely pure products suitable for use as solvents in ultraviolet spectroscopy are described.—*Joseph S. Caldwell*.

6820. MOULIN, F. DE. Untersuchung über das Wesen der Leukocytengranula (Vorläufige Mitteilung). [Nature of leucocyte granules (preliminary note).] *Arch. Zellf.* 17: 397-418. 1923.—An investigation of erythrocytes and of different types of leucocytes from the blood of various animals leads the author to conclude that the granules usually found in the protoplasm of these cells are not normally present, but are coagulation products formed as the

result of thermal, mechanical and physico-chemical stimuli. Fixed material thus gives a false impression of the protoplasmic structure of these cells, which in reality is homogeneous in consistency. The author also discusses the selective affinity of stains for certain substances from the standpoint of the physical and chemical properties of these substances.—*Ralph E. Cleland.*

6821. SANNIÉ, C. Description d'une électrode à hydrogène pour la mesure du pH sur de petites quantités de liquides biologiques. [Description of a hydrogen electrode for measurement of the pH of small quantities of biological fluids.] *Compt. Rend. Soc. Biol.* 90: 84-85. 1924.—An apparatus is described which can be operated unexposed to the air, uses small quantities, and permits stirring. It is recommended especially for work on liquids such as the blood.—*Oran Raber.*

6822. SIERAKOWSKI, S., ET F. MILEJHOWSKA. Capacité de neutralisation des acides et des bases par les milieux bactériens et par les liquides physiologiques. [The capacity of bacteriological media and physiological liquids to neutralize acids and bases.] *Compt. Rend. Soc. Biol.* 90: 704-706. 2 fig. 1924.—The neutralising capacity or buffer action is given for peptone, agar, gelatin, beef extract, beef bile, saliva, horse serum, cow's milk, and gastric juice.—*Oran Raber.*

6823. WALTON, GEORGE P., AND MAYNE R. COE. Determination of starch content in the presence of interfering Polysaccharids. *Jour. Agric. Res.* 23: 995-1006. 1923.—This method was developed primarily for the accurate determination of starch in impure linseed cake or meal, as an aid in detecting adulteration of such products. The pure seed of the flax plant contains no starch, while the non-flax material normally associated with flaxseed usually contains starch, but not in excess of 50%. As the allowable limit of non-flax material in linseed cake or meal has been placed at 6%, such a product containing more than 3% starch may be held to be adulterated. The presence of a carbohydrate mucilage in linseed products has been an obstacle to the estimation of starch by previous methods because of the impervious nature of the mucilage, and the fact that (like starch) it yields glucose on acid hydrolysis. The mucilage, unlike starch, is not hydrolyzed by the diastase of barley malt, however, nor are other polysaccharids like pectin which have interfered with the determination of starch in various vegetable products. This method makes use of the fact, brought out in this study, that the starch conversion products obtained by digestion with malt diastase, are soluble in 60% alcohol, while the unchanged interfering polysaccharids are insoluble. After filtering off the interfering substances, the 60% alcohol solution containing the digested starch is evaporated to eliminate alcohol, and the hydrolysis of the starch conversion products is then completed by heating with dilute acid. In determinations made on mixtures prepared in the laboratory, 97.2-99.9% of the starch known to be present was accounted for. The possibility of adsorption of the starch conversion products by colloids coagulated by the 60% alcohol was investigated by precipitating twice with the alcohol and examining both filtrates. The amount of adsorption was found to be negligible.—*G. P. Walton.*

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 6346, 6371, 6374, 6377, 6384, 6388, 6390, 6393, 6394, 6395, 6458, 6464, 6587, 6599, 6604, 6613)

6824. BERRY, R. A. The manurial properties of lead nitrate. *Jour. Agric. Sci.* 14: 58-65. 1924.—Although $Pb(NO_3)_2$ may supply nitrate to plants in available form its fertilizing properties may be completely destroyed by the toxicity of the Pb and the interaction of the salt and the soil constituents. It was found that $Pb(NO_3)_2$ as a source of N for fertilizing purposes is equal to $NaNO_3$ when applied in quantities equal to those employed in agricultural practice. No trace of Pb could be found in the plants, neither could Pb be detected in a water extract of the treated soil. Except in solutions of fairly high concentration, the soil adsorbs the Pb and destroys the toxicity of soluble Pb salts. There is evidence to show that the addition of Pb salts increased the rate of nitrification in the soil.—*R. P. Marsh.*

6825. BUCKLE, PHILIP. A preliminary survey of the soil fauna of agricultural land. *Ann. Appl. Biol.* 8: 135-145. 1921.—The writer found that distribution and numbers are more stable on grass than on arable land on account of the availability of more food and because there is less disturbance than there is on cultivated land where the insects are exposed to weather, birds and other factors. The number on both grass and cultivated land is greatest when vegetation is most luxuriant. There was no characteristic fauna of arable land but dominant species may depend on the crops grown.—*E. C. Stakman.*

6826. BUCKMAN, H. O., P. E. KARRAKER, AND R. I. THROCKMORTON. The organization of a general introductory course in soils with special reference to the laboratory exercises. *Jour. Amer. Soc. Agron.* 16: 86-91. 1924.

6827. DEIGHTON, THOMAS. The effect of movement of soil salts on standardization values of electrodes used in moisture determinations. *Jour. Agric. Sci.* 13: 440-446. *Fig. 1-2.* 1923.—In making electrical determinations of moisture in soil in a box, previous American observation was confirmed, to the effect that standardization values in normal soils will not be altered to any material extent by every passing shower.—*S. Lomanitz.*

6828. DODD, A. H. The determination of potash in soils. *Jour. Agric. Sci.* 14: 139-150. 1924.—It is recommended that the cobaltinitrite method for the determination of potash in soils should replace the perchlorate method as the official method. The advantages of the former and the disadvantages of the latter method are pointed out.—*R. P. Marsh.*

6829. ESPINO, R. B., AND B. O. VIADO. A preliminary study of the salt and fertilizer needs of the young abaca (*Musa textilis*) plant. *Philippine Agric.* 12: 127-133. 1923.

6830. GERICKE, W. F. The beneficial effect to plant growth of the temporary depletion of some of the essential elements of the soil. *Science* 59: 321-324. 1924.—In an effort to determine the influence of a temporary depletion of one or more of the essential plant food elements, experiments with a large number of complete nutrient solution cultures were conducted, and also with a large number of solutions complete except for one plant food element. Most striking results were obtained from the cultures that grew 1 month in the complete nutrient solutions and were then transferred to solutions devoid of potassium. Six weeks after the transfer was made a marked increase in vegetative vigor, increase in total weight and hastened maturity were observed, as compared with the control cultures. The writer believes there is a close parallel between conditions in the solution cultures and in the field with respect to available K, and suggests the possibility of developing a formula as an expression of soil fertility. This formula would include (1) the factor of supply, or rate thereof, which has long been recognized, and 2 new factors, (2) the physiological requirement of the plant and, (3) soil adjustment. "That the temporary depletion of certain available nutritive elements in the soil by plants—the very process that makes for infertility and soil exhaustion—is also one of Nature's most important agencies and conditions essential for large crop production, is the conclusion of this paper." Reference is made to the work of Stewart and of the writer relating to "physiologically paired" ions of the essential plant food elements.—*A. M. Smith.*

6831. HERNAIS, P., AND R. B. ESPINO. Soil moisture requirements of young abaca plants. *Philippine Agric.* 12: 121-126. 1923.—Best growth of *Musa textilis* was obtained with 60 to 80% saturation.—*Sam F. Trelease.*

6832. JOFFE, J. S. Acid phosphate production by the Lipman process: I. Effect of moisture content of sulfur-floats-soil mixtures on sulfur oxidation activities. *Soil Sci.* 14: 479-483. 1922.—For ideal sulphur oxidizing conditions the cultures should be started with a moisture content of 50% saturation, and after the reaction reaches pH 2.8 the moisture content should be gradually raised to 60% of saturation.—*W. J. Robbins.*

6833. MATTHEWS, A. Partial sterilization of soil by antiseptics. *Jour. Agric. Sci.* 14: 1-57. 1924.—Determinations were made of the effect on soil protozoa and bacteria of various antiseptic substances including benzene and its homologues and derivatives, carbon disulphide, ammonia, formaldehyde, and chloropicrin. The effects of partial sterilization on fungi and eelworms were also investigated. It was found that the disinfectants disappeared from the soil rather quickly. Bacteria were reduced in numbers for the first few days, then rose to a maximum, and finally fell slowly to the normal. Aeration had a marked influence

on the rapidity of the changes. Increase in the number of bacteria varied in the same direction as the molecular weights and heats of combustion of the antiseptic substances and is attributed to the latter property. It is concluded that the rise in numbers of bacteria is due largely to the effect of antiseptics on the bacteria and not alone to destruction of the protozoa. Increased fertility is attributed to the activity of the greater bacterial population in breaking up the organic matter of the soil. The introduction of a CH_3 group into the benzene ring decreased toxicity to soil organisms while a single Cl or nitro group increased toxicity.—*R. P. Marsh.*

6834. PAGE, H. J. **On the perchlorate method for the estimation of potassium in soils.** Jour. Agric. Sci. 14: 133-138. 1924.—It is pointed out that the perchlorate method of estimating potassium is simpler than the older platinum chloride method. It is shown that the presence of chloric acid in the perchloric acid used for the estimation of K in soils, fertilizers, and plant materials by the Davis method gives rise to very erratic and erroneous results. Considerable saving of perchloric acid may be effected in the application of Neubauer's method of treatment of soil extracts by adding only 0.1 gm. of CaCO_3 to the extract instead of the 0.5 gm. generally used.—*R. P. Marsh.*

6835 RIVIERE G., ET G. PICHARD. **De la sterilisation du sol au moyen de l'arsenate de soude.** [Partial sterilization of soil with arsenate of soda.] Jour. Soc. Nation. Hort. France 23: 141-142. 1922.—Applying arsenate of soda to the soil for potatoes at the rate of 20 and 30 kgm. per hectare increased the yield 2000 and 2540 kilos per hectare respectively. The writers express the belief that in such small doses the material is not toxic to potatoes but is sufficiently toxic to kill protozoa which destroy bacteria.—*H. C. Thompson.*

6836. SANYAL, P. B. **A method for the accurate determination of carbonic acid present as carbonate in soils.** Agric. Res. Inst. Pusa Bull. 151. 1-8. 3 fig. 1923.—The amount of organic C in Pusa soil is very small compared to the amount present as carbonate; therefore, greater accuracy for measuring carbonic acid is needed than is afforded by the usual method. A special method of procedure is described.—*H. M. Jennison.*

6837. THORNTON, H. G. **On the development of a standardized agar medium for counting soil bacteria, with special regard to the repression of spreading colonies.** Ann. Appl. Biol. 9: 241-274. 1922.—Attention is called to the necessity of using a uniform medium on which reproducible results can be obtained. Details are given for making an agar medium which proved very satisfactory. Pure chemical compounds which did not cause significant changes in reaction of the medium during sterilization were used. On this medium the best results with soil organisms were obtained by incubating at 20°C . for 10-12 days, thus giving slow-growing colonies time for development. Surface spreading colonies often interfere with the accuracy of results on ordinary media. A medium was developed which reduced the rate of multiplication and consequently the degree of spreading. Out of 4000 platings only 3% were lost on account of surface spreading colonies. The medium was tested extensively with results which were uniform and reproducible in different batches.—*E. C. Stakman.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 6344, 6345, 6375, 6391, 6392, 6453, 6472, 6473, 6485, 6496, 6513, 6528, 6534, 6537, 6580, 6618)

6838. HASTINGS, GEORGE T. **Spring flowers in the winter.** Torreyia 24: 1-4. Pl. 1. 1924.—Characters are given by which some of the spring flowers may be recognized by the underground bulbs, rootstocks, and buds. The plants noted are: *Hepatica triloba* and *H. acutiloba*, *Geranium maculatum*, *Claytonia virginica*, and *Smilacina racemosa*.—*J. C. Nelson.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

SAM F. TRELEASE, *Editor*

6839. CLUTE, WILLARD N. Practical plant protection. Amer. Bot. 30: 68-71. 1924.—This is an analysis of the conditions which should lead to plant protection.—*Susan P. Nichols.*

6840. CONN, H. J. Investigations concerning imported biological stains. Science 59: 328-331. 1924.—As chairman of the Commission on Standardization of Biological Stains, the writer tells of some of the points brought out by recent studies of domestic and imported samples of methylene blue, safranin, eosin, cresyl violet, and methyl green. It has been shown that pre-war imported dyes were not constant in quality and that supplies from the same firms still differ. The quality of dyes can be controlled best by coöperation with domestic firms.—*C. J. Lyon.*

6841. DENNE, M. T. A new variable light screen for use with the microscope. Jour. Roy. Microsc. Soc. London 1924: 49-52. 2 fig. 1924.

6842. HALL, WILLIAM EWART. A description of an apparatus for the extraction of micro-organisms from samples of water. Jour. Roy. Microsc. Soc. London 1924: 46-48. Pl. 6. 1924.

6843. JEWSON, SIBYL T., AND F. TATTERSFIELD. The infestation of fungus cultures by mites. Ann. Appl. Biol. 9: 213-240. 1922.—Attempts were made to find substances toxic to mites in fungous cultures. Three species of forage mites were found contaminating cultures. Of these, the flour mite, *Aleurobius farinae* De Geer, was the most abundant and widespread, but it did not destroy the mycelium. One of the cheese mites, *Tyroglyphus longior* Gervais, was seen in a few cultures. The infestation usually was slight, but the mycelium in several cultures of *Trichoderma* was destroyed almost entirely by this species. *Glyciphagus cadaverum* Schrank was found in one set of cultures. These three species often are found in dust from crevices of houses and stables. *Aleurobius farinae* and *Tyroglyphus longior* also attack Stilton and Cheddar cheeses. The life histories of the 3 species are similar. Laboratory apparatus can be rid of the mites by washing in strong ammonia. An effective method of treating cultures is to keep them for 16 hours in a tightly closed glass container of about 20 l. capacity, containing 20 cc. of commercial pyridine. Subcultures are then made and usually are free from mites. The eggs rarely survive this treatment. When infestation is serious, or in cold weather, the authors recommend that 2 exposures be made about 2 weeks apart. The pyridine is somewhat toxic to fungi in concentrations greater than 0.25%. However, it apparently inhibits growth but does not kill the spores. Its toxic effects apparently are due to its basic properties and not to the fact that it changes the pH value of the medium.—*E. C. Stakman.*

6844. LUMIÈRE, AUGUSTE, ET JEAN CHEVROTIER. Sur la préparation des sacs de collodion. [Preparation of collodion sacs.] Compt. Rend. Soc. Biol. 90: 769-770. 1924.—Models, prepared from 1 part of glucose syrup and 2 parts of powdered sugar, are attached to rods and dipped in the collodion. When dry they are suspended in water until the sugar dissolves, leaving the sac free.—*Oran Raber.*

6845. NEWSHOLME, ARTHUR. The elements of vital statistics in their bearing on social and public health problems. 623 p. D. Appleton & Co.: New York, 1923.

6846. PRESCOTT, SAMUEL CATE, AND CHARLES-EDWARD AMORY WINSLOW. Elements of water bacteriology, with special reference to sanitary water analysis. 4th ed., rewritten, 211 p. John Wiley & Sons: New York, 1924.

6847. TONNOIR, A. L. Appareils pour l'élevage en eau courante des organismes de petite taille. [Apparatus for breeding organisms of small size in running water.] Ann. Biol. Lacustre 12: 319-328. Fig. 1-2. 1923.—A description is given of an arrangement by means of which evaporating dishes may be used in series, one above the other, for breeding small creatures. Water is led to the uppermost dish and allowed to overflow by suitable tilting of the dish into the next dish below, and so on down the series. The small creatures are prevented from being carried over with the water by a fine copper gauze cemented inside the dish with wax. Description of an aquarium for raising small aquatic insects is also given.—*Nellie Carter.*

6848. TRELEASE, SAM F. **The Third Cincinnati Meeting of the American Association for the Advancement of Science.** *Nature* 113: 288-289. 1924.

6849. WASHBURN, F. L. **Breadfruit in the Marquesas.** *Science* 59: 359-360. 1924.—
It is unlikely that the disappearance of pure-blooded Marquesans will mean the extinction of breadfruit, since the other inhabitants will preserve it for their food.—*C. J. Lyon.*